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No. 34

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BIOMEDICAL AND BEHAVIORAL SCIENCES

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CONTENTS

PUBLIC HEALTH

UDC 579.8.04:53.093

DYNAMICS OF DEHYDRATION OF MICROBIAL CELLS IN AN AERODISPERSED STATE UNDER VARYING ATMOSPHERIC HUMIDITY

Moscow ZHURNAL MIKROBIOLOGII EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian No 9, Sep 81 (manuscript received 4 Nov 80) pp 62-56

[Article by V. F. Konyukhov and L. A. Mal'tseva, Epidemiology and Microbiology Institute imeni Gamaleva, USSR Academy of Medical Sciences, Moscow]

[Text] The range of infections transmitted by way of the air is extremely broad; moreover, this is a major means of transmission for many infections. The protection of man from such infections presents certain difficulties, insofar as the laws determining the behavior of microorganisms in the air remain unstudied.

A large number of investigations have been devoted to studying the survivability of bacteria in the air; reviews of these studies are also available [6,10]. An analysis of these publications provides a basis for concluding that the most lethal effect on bacteria in an aerodispersed state is exerted by humidity, but the reasons for the bacterial loss of viability under these conditions are unclear.

We studied the dynamics of microbial-cell dehydration in the air and the influence of this process upon microbial-cell viability using the nuclear magnetic resonance (NMR) method.

Materials and Methods. Utilized in the work were E. coli strains WP-2 and BS-1 of the B group and, also, PC 2276 and PC 2277 of the K12 group. The cultures were cultivated in Hottinger's bouillon (240 mg% amino nitrogen) with the addition of 0.1% glucose under aeration conditions for 20 h at 37° C. The developed cells were settled by centrifugation, then washed twice with distilled water. The concentration of living cells was determined by seeding on meat-peptone agar. To mark the bacterial aerosol, Bac. subtilis spores were used following the method described by Anderson [7].

In order to study the action of humidity on bacterial cells when they are aerosolized and located in the air, a method was used that involved spraying the cells onto spheres prepared from glass fiber [3].

After exposure in a climatic chamber for one hour, spheres that had been sprayed with microbial cells were subjected to bacteriological analysis to determine cell survivability; meanwhile, a different portion was placed in an NMR spectrometer to study the dynamics of cell dehydration by the characteristics of the proton magnetic resonance (PMR).

The PMR characteristics--spin-spin (T_2) and spin-lattice (T_1) relaxation times--were measured on an SXP-4-100 spectrometer from the Brucher firm at 90 MHz frequency and 22° C temperature. The T_2 was measured by the Meiboom-Gill method [14] with a precision of $\pm$15%; the T_1, by the 180-90° pulses method [8] with a precision of $\pm$10%.

The total quantity of water (bound and free) was determined by a precise weighing of the samples and, also, by the amplitude of the NMR signal after a 90° pulse. The content of bound water in the cells was measured using NMR following Kuntz's method [12] by the quantity of water not freezing at -25° C. The microbial-cell dry mass was determined by weighing moist samples and samples dried to a constant mass in a desiccator at 104° C.

Results and Discussion. The death of microbial cells on microfilaments at a constant 20° C temperature occurred most intensively during the first 2 min (Fig. 1), after which the rate of death as a function of atmospheric humidity declined more or less sharply. The greatest death was noted at an atmospheric humidity in the 50-60% range, which is consistent with the data of other authors.

Under these same experimental conditions the proton-relaxation time of microbial cells in a simulated aerosol state was shorter than in normal air; the T_1 was in the 0.5-40 msec range and the T_2, in the 20-200 msec range. The ratio of measured times, T_1/T_2, was within the limits of 5 to 40, which indicated the presence of bound water in the cells. A single relaxation time was observed in all samples for both T_1 and T_2, which indicated the rapid exchange between bound and free water and the absence of discrete, poorly-permeable microregions containing water.

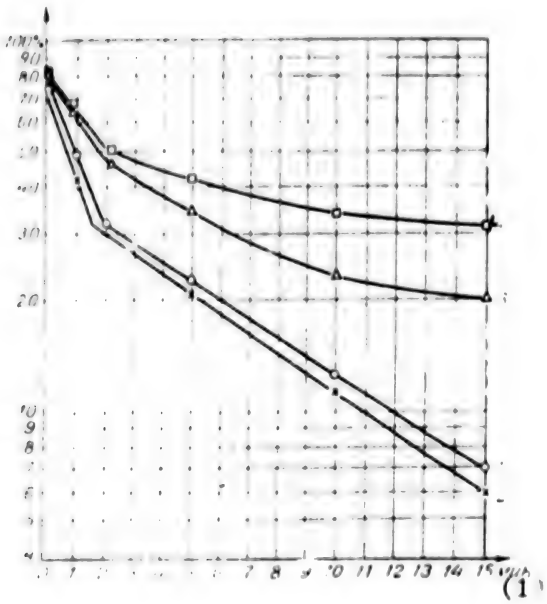

Fig. 1. Survivability of E. coli BWP-2 in air as function of atmospheric RH (ordinate) and exposure time (abscissa). 1--RH is 40%, 2--55%, 3--75% and 4--90%.

Key:
1. min

The measurement of the quantity of bound and total water contained in microbial cells as a function of atmospheric relative humidity (RH) and exposure time showed (Fig. 2) that the rapid removal from the cell of all free water occurred during the initial period of observation. This process was completed after 1.5-2.5 min in the 40-90% RH interval. The evaporation rate declined markedly after the removal of the free water, and a steady-state condition of equilibrium later gradually developed between the atmospheric moisture and the intracellular bound water. After 15 min (when a steady-state equilibrium condition had already developed), 0.12 ± 0.05, 0.18 ± 0.05, 0.22 ± 0.05 and 0.34 ± 0.05 g bound water per 1 g dry mass (g H_2O/g d. m.) remained in the microbial cells at atmospheric RH's of respectively 40, 55, 75 and 90%, while prior to dispersal the bound-water content in bacterial cells was 0.38 ± 0.05 g per 1 g dry mass.

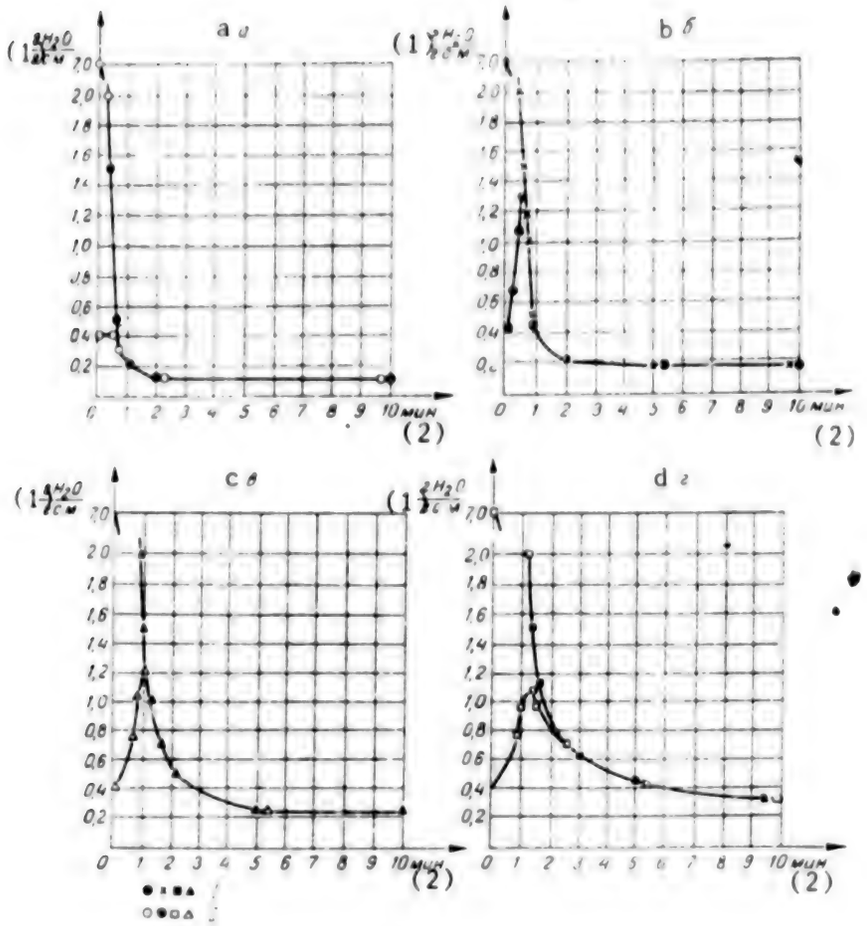

Fig. 2. Dynamics of dehydration of aerosolized E. coli at atmospheric RH's of 40% (a), 55% (b), 75% (c) and 90% (d). I--total water; II-bound water.

Key:

1. g H_2O/g d. m.
2. min

Thus, the following pattern was noted: the lower the atmospheric humidity the greater the initial evaporation rate and the less bound water remaining in the cells upon the attainment of steady-state equilibrium.

It was additionally established in the experiments that, as long as the cells contained free water, the bound-water content of cells increased at RH's within the 55-90% range by approximately 3.5-fold compared with the bound-water content of cells in a suspension. In this humidity range, the quantity of bound water reached a maximum most rapidly at 55% RH and most slowly at 90% RH. At RH's below 40%, the quantity of bound water in the cells increased slightly during the first minutes and then declined to 1/3 its initial value.

It is known that a specific quantity of water is necessary for maintaining the structure of the macromolecular cell components. A decline in the quantity of bound water below a specific limit causes phase transitions in the lipids, a loss of biochemical activity and conformational transitions in proteins, RNA and DNA. In its turn [4, 5], the quantity of bound water in the presence of free water depends upon the conformation of high molecular weight substances and the structure of supramolecular structures [13]. Therefore, the appreciable increase in bound water in cells at 55-90% RH's suggests large changes in the state of macromolecules and supramolecular structures even at an early stage of stay of the microbial cells in an aerosol and, also, the aggregation of macromolecules in the cells [1, 13]. The absence of an appreciable increase in the quantity of bound water in cells at 40% RH indicates that aggregation and large conformational changes in macromolecules do not occur under these conditions.

A similar dependence of change in the conformation of polylysine in films upon atmospheric humidity and the rate of transition from solution to film has been described in the literature [9]. The authors of these observations concluded, first, that the structural state of peptide compounds in films depends both upon the final atmospheric relative humidity and upon the rate of the hydrational or dehydrational procedure and, second, that the rapid removal of water at an RH of below 40% fixes the structuretpresent at a high humidity or in a concentrated solution. Probably, the conclusions cited are also valid for the macromolecules of aerosolized microbial cells.

Comparison of the obtained viability parameters for aerosolized E. coli cells at various RH's with the dynamics of their dehydration shows, first, that the rate of cell death in the 55-90% RH range is greater the greater the rate of evaporation of water from the cells during the first period of stay in the aerosol and, second, that cell survivability is higher the greater is the bound water remaining in the cells until the attainment of the steady-state condition.

The change in the death rate of microbial cells in an aerosol from the more rapid initial to the slower rate after 1-2.5 min is associated with the complete removal of free water and, consequently, with the stoppage of the chemical reactions occurring in the cytoplasm. The actual slowing of the death rate of microbial cells after the removal of free water is apparently associated with the fact that bound water, thanks to the stronger bonds holding it to the cell macromolecules, is removed at a much lower rate than is free water.

The cause of the death of aerosolized microbial cells is apparently the irreversibility of aggregation and of the conformational changes occurring in the macromolecules as a result of rapid dehydration. The degree of irreversibility of aggregation and conformational changes is apparently a function of the rate and degree of removal of free and bound water. Our subsequent paper will be devoted to clarifying this question.

Also of interest is the fact that two T_2 times were noted in the group-K12 strains at a 50% RH and higher even after a 1 min stay in the aerosol,

indicating the existence of two water fractions, between which there is a slow exchange. These two fractions are comparable in size. Thus, the fraction with the short relaxation time T_{21} comprised 0.2(g H_2O/g d. m.) in PC 2276 strains at a 50% RH after a stay of 1 min in the aerosol, while the fraction with the long relaxation time T_{22} comprised 0.1(g H_2O/g d. m.). The fraction of water with the short relaxation time T_{21} = 1-2 msec is bound water--it does not freeze at -25° C but is readily removed during drying at 104°C. The other water fraction with the long T_{22} = 50-100 msec consists of a large quantity of free water that is rapidly exchanged with a small quantity of bound water; it is removed from the cells only after warming at 104°C for 48 h and freezes at -25°C.

Thus, this water fraction, consisting primarily of free water, is apparently sequestered in the cell in certain closed structures, which greatly hinders its exchange with other water molecules. A similar phenomenon was observed [2] after the lyophilic drying of desert-strain yeasts; moreover, the authors related this phenomenon to the presence of adaptive mechanisms providing for the viability in the desert of these yeast strains. However, it is not clear in the case of the K12-E. coli PC 2276 and PC 2277 strains whether the free water found in closed regions serves to increase viability in an aerosol or, on the contrary, if it is evidence of membrane dehydration, when closed membrane vesicles are formed [11].

Conclusions

1. Escherichia coli cells in an aerodispersed state lost, in 1-2.5 min as a function of RH (40-90%), all free water, after which a steady-state equilibrium condition developed between atmospheric moisture and the intracellular bound water of the bacteria.

2. From 0.12 to 0.34 g bound water per 1 g dry mass remained in microbial cells after 15 min of stay in air at a relative humidity of from 40 to 90%, respectively, while prior to dispersal the cells contained 0.38 g bound water.

3. As long as free water was retained in microbial cells transferred to an aerodispersed state at a 50-90% RH, the bound-water content increased in the cells by approximately 3.5-fold compared with the content in cells of a suspension, which is evidently related to an aggregation and change in the conformation of macromolecules. The content of bound water in aerosolized cells did not effectively increase at a 40% RH.

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9942
CSO: 1840/307

UDC: 547.964.4.02:543.42

SPATIAL STRUCTURE OF δ-SLEEP PEPTIDE AND ITS ANALOGS. LASER RAMAN SPECTRA

Moscow BIOORGANICHESKAYA KHIMIYA in Russian Vol 8, No 7, Jul 82
(manuscript received 27 Jan 82) pp 900-904

NABIYEV, I. R., Moscow Institute of Engineering and Physics,
SARGSYAN, A. S., YEFREMOV, Ye. S., MIKHALEVA, I. I. and IVANOV, V. T.,
Institute of Bioorganic Chemistry imeni M. M. Shemyakin, USSR Academy
of Sciences, Moscow

[Abstract] A study is made of the interaction between the structure of the endogenous nonapeptide δ-sleep and its biological functions reported to include electroencephalographic and behavioral alteration characteristic for the slow phase (δ phase) of sleep. The peptide and its tyrosine-containing derivatives are studied by laser Raman sepctroscopy, which has not been widely applied to oligopeptides. The spectra and their changes upon pH titration are presented. Analysis of the spectra indicates that a change in the groups in positions 7 and 8 on the Tyr group leads to no signi icant change in peptide conformation, whereas similar replacement of the Ala^6 and Glu^9 groups significantly influences conformation. This indicates the molecule has a twisted conformation with a β bend in sector 6-9. Figures 2; references 13: 2 Russian, 11 Western.
[197-6508]

UDC: 547.993.04:591.185.3

PRODUCTION OF PHOTOACTIVATED MONODERIVATIVES OF NAJA NAJA OXIANA NEUROTOXIN II AND THEIR INTERACTION WITH ACETYLCHOLINE RECEPTOR

Moscow BIOORGANICHESKAYA KHIMIYA in Russian Vol 8, No 7, Jul 82
(manuscript received 18 Jan 82) pp 905-912

PLUZHNIKOV, K. A., KARELIN, A. A., UTKIN, Yu. N., TSETLIN, V. I. and
IVANOV, V. T., Institute of Bioorganic Chemistry imeni M. M. Shemyakin,
USSR Academy of Sciences, Moscow

[Abstract] The topography of the neurotoxin-receptor interaction is studied by means of photoinduced cross links. Neurotoxin-II was modified in an

Na-acetate buffer in the presence of 6 N guanidine hydrochloride with a reagent:protein ratio of 1.1:1. Six fractions of NT-II monoderivatives were produced. All derivatives can be photoactivated and form covalent cross links withtthe acetylchloline receptor. The high degree of covalent bonding is apparently explained by the great strength of the neurotoxin-receptor complexes. The results produced show that photoactivated labels in various protions of the neurotoxin molecule bond covalently with the acetylcholine receptor. Only the Lys^{46} derivative does not cross link with the receptor. Figures 4; references 22: 1 Russian, 23 Western. [197-6508]

UDC 576.851.45.098

3':3'-CYCLIC-NUCLEOTIDE PHOSPHODIESTERASE FROM Yersinia pestis EV

Kiev MIKROBIOLOGICHESKIY ZHURNAL in Russian Vol 44, No 3, May-Jun 82 (manuscript received 30 Mar 81) pp 3-8

SHEVCHENKO, L. A., GONCHAROV, Ye. K. and MISHAN'KIN, B. N., Rostov-na-Donu Scientific Research Antiplague Institute

[Abstract] 3':5'-Cyclic-nucleotide phosphodiesterase (PDEase) (EC 3.1.4.17), which regulates cyclic-AMP levels, was isolated from Yersinia pestis EV and purified by chromatography, gel filtration, and disc electrophoresis, and its properties were compared with those of PDEases from guinea pig brain and spleen. No endonuclease, exonuclease or 5'-nucleotidase activity was detected in purified preparations. The main purification step was polyacrylamide gel disc electrophoresis. Themolecular weight of the bacterial PDEase was 70,000, and of spleen and brain PDEases, 200,000 and 660,000, respectively. Bacterial PDEase was minimally soluble at pH 4.4 and exhibited peak activity at pH 7.0-7.4 (tris-HCl buffer). The Michaelis constant was $3.64 \cdot 10^{-5}$ M for the spleen enzyme, which indicates that substrate affinity of the bacterial enzyme is twice as high. Temperature optimum for bacterial enzyme activity was 28-40°C. Study of the effect of metal ions and other substances on bacterial enzyme attivity showed that Co^{+++} and Ca^{++} had an activating effect, Zn^{++}, Fe^{++}, ethylenediaminetetraacetic acid and sodium deoxycholate an inhibiting effect, and Li^{+}, Fe^{+++} and PO_4^{---} a minimal effect. Theophylline and caffeine, recognized as potent animal PDEase inhibitors, had an inhibiting effect on bacterial PDEase only at very high concentrations. Figures 6; references 12: 8 Russian, 4 Western. [192-9307]

UDC 576.858.8:632.38:633.11

BIOLOGICAL PROPERTIES OF PATHOGEN OF LEAF SPOT, A NEW VIRUS-LIKE DISEASE OF CEREALS

Kiev MIKROBIOLOGICHESKIY ZHURNAL in Russian Vol 44, No 3, May-Jun 82 (manuscript received 6 Feb 81) pp 38-41

BORODINA, Ye. Ye., SUKHAREVA, S. I., SHTEYN-MARGOLINA, V. A., YEVGRAFOVA, L. P. and KRYLOV, A. V., Biology-Soil Institute of Far-Eastern Scientific Center of USSR Academy of Sciences; Biological Institute of the Leningrad State University; Institute of Biochemistry imeni A. N. Bakh, USSR Academy of Sciences

[Abstract] The biological properties of the cereal spot pathogen, its plant hosts and their response to infection, means of transmission and the relationship between pathogen and vector were studied. Leaf spot could not be passed on by seeds, plant remains, soil or mechanical inoculation. Cereal spot was transmitted by Aceria tritici and Aculodes mckenziei, and could be transmitted transovarially in A. tritici. The disease was transmitted by A. mckenziei to infested barley and wheat plants; not all wheat cultivars, however, were susceptible. Of 34 grass species tested, only Phleum arundinacea, Lolium perenne and L. multiflorum exhibited mite infestation and disease symptoms. Agrostis alba exhibited only disease symptoms. The latent infection period was 3-5 days and sometimes 7-10 days. Transmission of spot by A. tritici was studied in 68 species of grasses, cereals and other plants. Mites infested Lolium spp. and Agropyron cristatum and one barley cultivar. Disease symptoms, however, were noted on a much wider variety of plants, including barley and sorghum, Brachypodium sylvaticum, Coix lacryma-jobi, Cynodon dactylon, Phalaris paradoxa, and others. Symptoms generally appeared within 2-7 days but sometimes even after 19 days. Presence of mite colonies and disease symptoms coincided in most cases. Symptoms (light-green mosaic spots on leaves followed by systemic yellow-green or white spots), type of transmission and some aspects of the pathogen-vector relationship indicate a viral cause. The pathogen of this disease is similar in host range, symptoms, and latent period to wheat spot mosaic and wheat spot chlorosis viruses, but differs in that it does not infect rye. References 15: 5 Russian, 10 Western.
[192-9307]

UDC 581.323.1

ROLE OF PATHOTOXINS IN PLANT-PATHOGEN RELATIONSHIPS

Moscow PRIKLADNAYA BIOKHIMIYA I MIKROBIOLOGIYA in Russian Vol 18, No 2, Feb 82 (manuscript received 8 May 81) pp 147-157

LYUBIMOVA, N. V., Institute of Biochemistry imeni A. N. Bakh, USSR Academy of Sciences, Moscow

[Abstract] A review is provided of the data underlying the assumption that the primary determinant of a plant's susceptibility to a microbial pathogen

is the presence of appropriate pathotoxin receptors on the plasmalemma of the susceptible plant. Binding of the toxin to these receptors triggers a set of events--as yet unclarified--which renders the cell susceptible to invasion and infection. Plant resistance to a given pathogen rests on the absence of such protein receptors, a reduction in their number below some critical value, or a decrease in the affinity constant for the pathotoxin. References 60: 1 Russian, 59 Western.
[311-12172]

UDC 615.355:577.152.34]:615.451.234.03

POTENTIAL AND PROSPECTS IN USE OF IMMOBILIZED PROTEOLYTIC ENZYMES AND PROTEINASE INHIBITORS

Moscow VESTNIK AKADEMII MEDITSINSKIKH NAUK SSSR in Russian No 9, Sep 82 (manuscript received 7 Dec 82) pp 74-78

STRUCHKOV, V. I., GOSTISHCHEV, V. K., VASIL'KOVA, Z. F., STRUCHKOV, Yu. V., LARIONOVA, N. I., VIRNIK, A. D. and VLADIMIROV, V. G., First Moscow Medical Institute imeni I. M. Sechenov

[Abstract] A short review is provided of experimental trials in animals of the therapeutic use of immobilized proteinases and proteinase inhibitors. In summary, the results have shown that various proteolytic enzymes (trypsin, chymotrypsin, terrilitin [six]) are effective agents, when immobilized, in enhancing wound healing, elimination of necrotic tissue, in fibrinolysis and in thrombolysis. Immobilization on various polysaccharide membranes protects such enzymes from being themselves rapidly inactivated and eliminated from the body, and also appears to render them less immogenic. Immobilized protease inhibitors have been shown to be effective in alleviating the autolytic process in experimental hemorrhagic pancreatitis and have prolonged the survival time of such animals. Another convenience of the immobilized preparations is the ease with which they can be manipulated and delivered to the target site. References 4: 3 Russian, 1 Western.
[255-12172]

MICROBIAL DEGRADATION OF THE ORGANOPHOSPHORUS INSECTICIDE FOSALON

Moscow IZVESTIYA AKADEMII NAUK SSSR. SERIYA BIOLOGICHESKAYA in Russian No 1, Jan-Feb 82 (manuscript received 19 Mar 81) pp 60-68

GOLOVLEVA, L. A., BASKUNOV, B. P., FINKEL'SHETYN, Z. I. and NEFEDOVA, M. Yu., Institute of Microbial Biochemistry and Physiology, USSR Academy of Sciences, Pushchino

[Abstract] Soil microorgainsims were tested for utilization of fosalon (O,O-diethyl-S-(6-chloro-2-oxobenzoxazolin-3-yl)-methylphosphoro-dithioate)

as either a sole carbon or phosphorus source. The resultant isolates were identified as belonging either to the fluorescent pseudomonads or acinetobacters. One isolate, tentatively identified as Acinetobacter calcoaceticus, utilized fosalon either as a sole source of carbon or phosphorus under aerobic or microaerophilic conditions and, via initial hydrolysis, transformed it to 2-amino-5-chlorophenol which underwent condensation to form 2-amino-7-chloro-3H-phenoxazin-3-one. The latter was found to persist in soil and culture fulid for at least three months. The long persistence of these products should stimulate further studies on the potential ecologic and toxic significance of fosalon and its metabolites in the natural environment. Figures 4; references 13: 8 Russian, 5 Western.
[293-12172]

UDC 576.8

PRACTICAL SIGNIFICANCE OF MICROBIAL VIRUSES IN INDUSTRIAL MICROBIOLOGY

Moscow IZVESTIYA AKADEMII NAUK SSSR. SERIYA BIOLOGICHESKAYA in Russian No 1, Jan-Feb 82 (manuscript received 20 Jul 81) pp 122-126

RAUTENSHTEYN, Ya. I., Institute of Microbiology, USSR Academy of Sciences, Moscow

[Abstract] A short review is presented of the problem of microbial viruses in industrial microbiology, in particular those infecting bacteria and actinomycetes. It appears that most industrially-useful strains of bacteria and actinomycetes are lysogenic and that special measures have to be taken to prevent conversion to lytic infection with negative consequences for microbial synthesis. An unanswered question in many cases is the contribution of the temperate phage to the commercial value of the lysogenic strains in the production of desired products. A promising approach to meeting the challenge of lytic conversion and the preservation of valuable cultures is to promote conditions favoring the lysogenic state and the introduction of stable temperate phages. References 9: 6 Russian, 3 Western.
[293-12172]

UDC 576.8

NEW PRODUCTS OF MICROBIAL DEGRADATION OF ORDRAM

Moscow IZVESTIYA AKADEMII NAUK SSSR. SERIYA BIOLOGICHESKAYA in Russian
No 1, Jan-Feb 82 (manuscript received 5 May 80) pp 126-130

ZYAKUN, A. M., NEFEDOVA, M. Yu., BASKUNOV, B. P. and FINKEL'SHTEYN, Z. I., Institute of Biochemistry and Physiology of Microorganisms, USSR Academy of Sciences, Pushchino

[Abstract] Studies were conducted on the metabolic transformation of ordram (S-ethyl-N-hexamethyleneiminethiocarbamate) by Bacillus sp. 168 and 508, Enterobacter sp. 418 and 539, and Nocardia globerula 640 on mineral medium supplemented with sucrose. Physioochemical methods were used to establish and identify three new products as S-ethyl-5-formylpentylthiocarbamate, S-ethyl-3-carboxypropylthiocarbamate, and ordram sulfoxide. Figures 2; references 8: 5 Russian, 3 Western.
[293-12172]

UDC: 547.964.4.07:543.544

HIGHLY EFFECTIVE LIQUID CHROMATOGRAPHY OF SYNTHETIC POLYPEPTIDE ACTH(1-24) AND INTERMEDIATE SYNTHESIS PRODUCTS

Moscow BIOORGANICHESKAYA KHIMIYA in Russian Vol 8, No 7, Jul 82
(manuscript received 25 Dec 81) pp 914-921

CHLENOV, M. A., TIMOVA, Ye. V., KUDRYASHOV, L. I., All-Union Scientific Research Institute of Blood Substitute and Hormonal Preparation Technology, Moscow

[Abstract] The highly effective liquid chromatography method is used to analyze the peptide ACTH(1-24), its analog [β Ala^1]ACTH(1-24) peptide and the synthesis imtermediates - fragments 1-4, 5-12, 13-19, 20-24, 13-24 and 1-24 in the ACTH sequence. The primary task in developing the method was selection of chromatographic separation conditions which would allow detection in each fragment of the synthesis intermediates which may be present as a result of incomplete purification. A Zorbax ODS column was used in selecting the optimal conditions, with a number of mobile phases. Chromatograms of artificial peptide mixtures are presented, showing the possibility of using the highly effective inverted-phase and ion-pair liquid chromatography methods to analyze partially purified ACTH fragments and the end product of ACTH(1-24) synthesis. Analysis of the purity of peptides obtained by chemical synthesis revealed the initial components as well as side products of synthesis in each ACTH fragment. Figures 6; references 19: 7 Russian, 12 Western.
[197-6508]

UDC: 547.963.32.07

SOLID PHASE SYNTHESIS OF OLIGO- AND POLYNUCLEOTIDES. PART II. SOLID PHASE SYNTHESIS OF HEPTADECADEOXYRIBONUCLEOTIDE T-C-A-T-T-C-C-T-T-A-C-T-C-T-T-C-A BY TRIESTER METHOD USING PROTECTED 5'-NUCLEOTIDES

Moscow BIOORGANICHESKAYA KHIMIYA in Russian Vol 8, No 7, Jul 82 (manuscript received 3 Feb 82) pp 1008-1010

AMIRKHANOV, N. V., RIVKIN, M. I. and KUMAREV, V. P., Institute of Cytology and Genetics, Siberian Division, USSR Academy of Sciences, Novosibirsk

[Abstract] A study was made of the possibility of block synthesis of oligodioxyribonucleotides on a polymer carrier by a modified triester method. The polymer carrier used was polystyrene grafted to the surface of polytetrafluoroethylene with monomethoxytrityl anchor groups. The end product oligonucleotide was separated by preparative ion exchange chromatography on C-300 aminochrome. A chromatographically and electrophoretically homogeneous product was obtained after ion exchange rechromatography and subsequent inverse phase chromatography. The total yield of heptadecadeoxynucleotide was 1.8% calculated from the initial thymidine attached to the polymer, an average of 60% in each of the 8 stages ignoring losses during splitting from the polymer and deblocking Figures 2; references 11: 5 Russian, 6 Western.
[197-6508]

UDC 576.8

RESPONSE OF CONTINUOUS YEAST CULTURE TO PULSATILE VARIATIONS IN SUBSTRATE FEED RATE OR CONCENTRATION

Moscow PRIKLADNAYA BIOKHIMIYA I MIKROBIOLOGIYA in Russian Vol 18, No 2, Feb 82 (manuscript received 12 Aug 81) pp 174-179

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[Abstract] Studies were conducted with continuous cultures of Candida guilliermondii grown on a synthetic medium supplemented with 2% paraffin (pH 4.2, 32°C), to determine the effects of variations in substrate feed rate and concentration on biomass accumulation over a 7 day period. After attainment of a steady state (7 days, ca. 60 generations with a feed rate of $D = 0.25\ h^{-1}$), the paraffin concentration was varied from 2 to 1.5% and then to 2% again at 2 h intervals for 7 days, and then the culture grown on 2% paraffin for another 7 days. The results showed that biomass yield was unaffected by variations in the feed rate, but that the substrate was

utilized much more efficiently. Additional studies defined the optimum feed rate variations as 0.25 → 0.30 → 0.25 h^{-1} at 2 h intervals.
Figures 2; references 8: 7 Russian, 1 Western.
[311-12172]

POOR PERFORMANCE OF SCIENTIFIC ACOUSTIC LABORATORY IN YEREVAN

Yerevan KOMMUNIST in Russian 21 Jan 83 p 4

[Article by M. Eremyants in the column "For the Effectiveness of Science": "Around Noise"; passages rendered in all capital letters printed in boldface in source]

[Text] WHAT IS DISCOMFORT?

It varies. But not everyone knows that a state of discomfort is a real threat to health. This is the kind of threat that acoustic discomfort has become in our days. The "noise element", "noise invasion" and "pollution", according to international data, is increasing by an average of 1-2 decibels per year and has long been a scourge of large cities, where it reaches 80-100 decibels! In order to gain an idea of the intensity of such noise, it is sufficient to state that it is capable of exceeding the roar of Niagara Falls.

Go out onto the Yerevan Boulevards Oktemberyan, Odrzhonikidze, Azatutyan and the streets Nalbandyana, Komitasa, Karmir Banaki or Kievyan during the peak hours. Even without a noise gage it is clear to you that noise has become a threat even for Yerevan, where its maximum level exceeds the norm by 10-30 decibels!

And the huge noise threat is not only a cause of premature hearing impairment--this is a lesser of the evils. Foremost is the extremely susceptible nervous system, and noise has become a cause of nervous, cardiovascular and even stomach diseases.

How to struggle with noise and who must do this?

AT THE 'POLE OF QUIET'

The Republican Acoustics Scientific Center of the Armenian Scientific Research Institute of Hygiene and Occupational Diseases, Armenian SSR Ministry of Health, was created one year ago. It developed in the facilities of this institute's Acoustics Laboratory, which is involved in the study of the influence of noise on man, and the facilities of the Armenian Scientific

Research Institute for SA [not further identified; Architectural Acoustics?]. The center is supervised by Candidate of Biological Sciences A. Arakelyan, who is also the chief of a laboratory.

The following BASIC FUNCTIONS were defined for the "pole of quiet", as it is graphically termed in the press by journalists: SCIENTIFIC INVESTIGATIONS FOR STUDYING THE INFLUENCE OF NOISE ON THE ORGANISM AND FOR CONSTRUCTION AND ARCHITECTURAL ACOUSTICS, THE DEVELOPMENT OF PROPHYLACTIC AND ENGINEERING-TECHNICAL MEASURES OF NOISE CONTROL, THE STUDY OF THE NOISE BACKGROUND IN LARGE CITIES AND INDUSTRIAL COMPLEXES AND, ALSO, EXPERTISE IN THE PLANNING OF ADMINISTRATIVE AND RESIDENTIAL BUILDINGS AND OBJECTS OF INDUSTRIAL CONSTRUCTION.

The acoustics center includes three laboratories: A. Arkelyan's Biomedical Laboratory; the Construction-Architectural Laboratory, whose chief is Candidate of Technical Sciences E. Dastakyan; and the Production-Acoustics Laboratory, whose chief is Candidate of Technical Sciences L. Mett. Here there are planning-construction and noise-measuring groups and a special computer center. A total of about 50 associates. In the Biomedical Laboratory alone are 22 people, fine equipment and unique anechoic chambers. The vibroacoustic apparatus for it was bought at a cost of more than 250,000 rubles! All the conditions for fruitful work.

Here they will tell you: the entire institute is responsible for two themes of Union [i.e., national] significance, while the acoustics-center's share is three that are included in the national-economic plans. But to the question, what has been done with respect to these subjects and what are the concrete results, the associates think and are slow with an answer. The reason for this is that while the results in the Contruction-Architectural and Production-Acoustics laboratories are evident--fulfilled economic-contractural works, reports on completed subjects and author's certificates--the Biomedical Laboratory is only credited with a noise map of Yerevan, made...before the center's organization, in 1976! And further--33 recommendations to the Yerevan City Soviet, still hanging in the air.

And of course more than five years have gone by.... The time has long passed to renew the map and data presented in it and to refine the survey results. Incidently, when this map was composed, 20 cities in the Union already had similar maps. There were also prepared recommendations and the accumulated experience of antinoise measures on national scales, which, however, were not applied to Yerevan. Also suprising is the inertia of the client--the Yerevan City Soviet Executive Committee, which paid 60,000 rubles for work that is very needed for urban management and shelved it!

While acknowledging the investigations conducted by specialists, it is impossible not to state: THERE HAS BEEN NO APPLICATION IN ANY OF THE LABORATORIES. And of course it is the moral duty of the scientist to secure the application of the results of his labor. Otherwise the occupation of science proves to be a way of satisfying personal curiosity at the expense of the state....

WITH REGARD TO THE BIOMEDICAL LABORATORY, DURING FIVE YEARS ITS ASSOCIATES HAVE NOT ONLY NOT PRODUCED NOR APPLIED A SINGLE PRACTICAL RECOMMENDATION OR CORRECTION TO THE NORMS, THE ALL-UNION STATE STANDARDS, BUT HAVE NOT EVEN PUBLISHED A SINGLE SCIENTIFIC ARTICLE IN THE BASIC DIRECTION OF WORK. It would seem that this fact should cause concern in the institute's management. But they apparently take long-term fruitless investgations for "great science".

Neither does the expensive technical equipment shown to each visitor help to justify such a situation. According to the testimony of competent commissions, THIS EQUIPMENT "MAKES IT POSSIBLE TO PROVIDE FOR HYGIENIC INVESTIGATIONS UNDER PRODUCTION AND EXPERIMENTAL CONDITIONS AT A HIGH, MODERN TECHNICAL AND METHODLOGICAL LEVEL", WHILE THE "HIGH QUALITY OF THE EXPERIMENTAL HEADQUARTERS PERMITS PERFORMANCE OF EVEN SUBTLE PHYSIOLOGICAL INVESTIGATIONS."

The question arises: who conducts the investigations? For the laboratory has long lacked physiological specialists!

The center was literally "saved" by a study conducted by economic contract by the scientists of the Human and Animal Physiology Department of the Biological Faculty of Yerevan State Universtiy and which cost the Republican Acoustics Scientific Center 16,000 rubles.

They reported on the work. And what next? Another "dead season"?

The "pole of quiet" fully merits its title, although in a somewhat different sense. Come here on a working day: one can scarcely succeed in finding an associate, say, behind the panel of a chamber or immersed "in scientific creativity" at his work place. A group of measurements, they say, on objects.... But where exactly? An unbusinesslike quiet here an an absence of people.

For here are such paradoxes as, on the one hand, a lack of specialist cadres in the Construction-Architectural and Production-Acoustics laboratories and, on the other, 22 workers in the Biomedical and not one result. Thirdly, the tunrover of cadres. In the last few years alone, 20 people were lost. The "iron trio", as the principal research nucleus of physicians and biologists was called here, disintegrated. T. Kurtandzhyan and E. Parasadanyan, enthusiasts for their work, have left. (The resignations came on the same day.) What happened in the center while the "noise" grew?

The opinion of some associates: A PROCESS OF DEVELOPMENT OCCURRED. PHYSICIANS AND SCIENTIFIC TECHNICAL PERSONNEL WERE GATHERED UNDER ONE WING BY WAY OF AN EXPERIMENT. A HYBRID ORGANIZATION, FROM WHICH DIFFICULTIES AROSE, BUT WHICH MUST BE OVERCOME...."

The opinion of others: IT WAS NECESSARY TO THINK OUT THE VALIDITY OF THE IDEA ITSELF AND WHAT RESULT IT MIGHT GIVE THE NATIONAL ECONOMY.

Objectively, however, THE CENTER IN FACT IS NOT A CENTER NEITHER FOR NOISE CONTROL NOR EVEN FOR THE RESEARCH CONDUCTED IN THIS DIRECTION IN THE REPUBLIC. Studies are not coordinated with other branch organizations. While the boom, created around noise, obscured the problem of how and for whom to control noise. Here is what happened: much noise and ... nothing.

HOW TO SOLVE THE PROBLEM?

Circumstances have evolved absurdly: the best equipment, technology and accomodations in the service of a laboratory whose output, mildly speaking, is zero. And the other links--the Construction-Architectural and Production Acoustics, carrying out developments and economic contracts and giving tangible results--are deprived not only of a base but even accomodations, and equipment stands in corridors. And of course their work is of practical value. But they operate at half strength.

It is entirely clear: THE REPUBLIC ACOUSTICS SCIENTIFIC CENTER, ORGANIZED WITH THE STATUS OF A DEPARTMENT OF THE ARMENIAN GENERAL HYGIENE AND OCCUPATIONAL DISEASES SCIENTIFIC RESEARCH INSITUTE, deprived of the appropriate material-technical base, CANNOT PRODUCE PLANNING-TECHNICAL DOCUMENTATION OR EXPLOIT EXPERIMENTAL-INDUSTRIAL SAMPLES OF NOISE- AND VIBRATION-REDUCING MATERIALS AND STRUCTURES AND, ALSO, APPARATUS AND INSTRUMENTS, AS IS REQUIRED BY THE CLIENT ENTERPRISES. For this, it ought to have had mechanical shops, testing units and proving grounds, a technical library and patent collection and duplicating equipment. Furthermore, it does not have the means of material supply of the engineering-technical personnel: highly-qualified engineers, mechanics, technologists, designers, builders and architects at the level of a scientific research institute or scientific production association of a technical profile, since the center is in the system of the Ministry of Health. Hence the lack of cadres.

AND HERE IT DEVELOPS THAT NEITHER ON ACCOUNT OF ITS STATUS NOR ON ACCOUNT OF ITS POTENTIAL, THE CENTER IS IN NO CONDITION TO GUARANTEE THE SOLUTION OF INVESTIGATED PROBLEMS.

In the Production-Acoustics Laboratory there are right now two million rubles worth of orders for the republic, while the possible expenditure is only 150,000 rubles per year. How many years are needed to satisfy the requirements of industry alone?

The November (1982) Plenum of the CPSU Central Committee stressed the need for decisively eradicating departmentalism and regionalism, to eliminate the specific difficulties that interfere with scientific-technical progress.

As the two-years experience of the technical subdivisions of the Republican Acoustics Scientific Center have shown, THEIR EFFECTIVE ACTIVITY IS POSSIBLE ONLY WITHIN A SCIENTIFIC PRODUCTION ASSOCIATION OR SCIENTIFIC RESEARCH INSTITUTE HAVING A PRODUCTION BASE, WITH THE STUDIES CONDUCTED ACCORDING TO A UNIFIED SUBJECT PLAN. AND SPECIFICALLY, THEY MUST BECOME A PRINCIPAL SUPPORT OF A UNIFIED CENTER FOR NOISE CONTROL AND MUST PROVIDE METHODOLOGICAL AND TECHNICAL SUPERVISION TO WORKERS IN PLANNING AND PRODUCTIONAL ENTERPRISE, INDEPENDENTLY OF DEPARTMENTAL AFFILIATION.

With regard to the biomedical investigations performed, is it not time to take them to a practical application? Ten years of existence of a laboratory is probably a sufficient time for that. One is disturbed not only by the absence in the republic of an organization responsible for solving the problem of reducing noise, but also the absence of a unified subject plan for the 11th Five-Year Plan, in which what is to be done in this direction would be outlined.

FROM THE EDITORS: Year by year, urban noise increases and noise discomfort at the republic's industrial shops and construction sites intensifies. This problem becomes more and more acute. But on checking, it turns out that there is no one to solve it.

Obviously, it is time for the republic's Ministry of Health and the Soviet Rayon Committee of the party to investigate carefully the situation in the Republican Acoustics Scientific Center, the activity of which leaves very much to be desired.

9942
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FORECASTING PSYCHOLOGICAL AND PHYSICAL PERFORMANCE UNDER STRESSFUL CONDITIONS

Frunze SOVETSKAYA KIRGIZIYA in Russian 25 Jan 83 p 3

[Article by Doctor of Medical Sciences A. Aydaraliyev, department chief, Institute of Alpine Physiology and Experimental Pathology, Kirgiz SSR Academy of Sciences: "Who to Take to Antarctica?"]

[Text] Doctor of Medical Sciences A. Aydaraliyev, department chief of the Institute of Alpine Physiology and Experimental Pathology, and D. Imanaliyev, an associate of the same institute, left the day before yesterday for Moscow to participate in the 28th Soviet Antarctic Expedition. For A. Aydaraliyev this was already the second trip to the frozen continent. The first was with the 25th Soviet Antarctic Expedition in 1979-1980. Then he went with another institute associate A. Maksimov, who even now is in Antarctica (for 15 months already). The participation of Kirghiz scientists in the work of the Antarctic expeditions has become a tradition.

Today we publish an article by A. Aydaraliyev, in which he discusses the scientific work of Kirghiz scientists in Antarctica.

Among the seven Soviet stations in Antarctica, Vostok is the intracontinental station. It is situated 1,410 km from the coast at an elevation of 3,488 m above sea level, in the region of the southern geomagnetic pole. Here are the most extreme conditions for life on earth. The mean annual temperature is -56 degrees. The air has a reduced oxygen content and is very dry. Expedition members studying this unique continent live under severe conditions.

The development of measures to preserve a high work capacity and health among expedition members was entrusted to the Arctic and Antarctic Scientific Research Institute Polar Medicine Department (Leningrad). The chief of this department, Doctor of Medical Sciences A. Matusov, wrote in one of his papers: "The currently-observed process of the vigorous commercial development and exploitation of the energy and raw-material bases of the Far North has advanced the boundary of habitation of the earth to higher latitudes. Mastery of the natural resources of Antarctica clearly demands the

establishment there of permanent settlements. We must prepare well in advance for the medical provision of newly-exploited regions."

But the presently-existing system for selecting members of Antarctic expeditions does not permit prediction of who can live and work under severe conditions and who cannot. As a result, some expedition members have been forced to return from Antarctica due to a sharp worsening of the state of health.

The Applied Physiology Department of our institute, jointly with the Problems Laboratory of the Department of Primary Faculty Therapy of the Kirgiz State Medical Institute, has developed recommendations for the prognosis of work capacity of man under alpine conditions. This makes possible the selection of people capable of living and working under conditions of oxygen deficit.

The work was developed further in investigations conducted in Antarctica. During the 25th Soviet Antarctic Expedition the author of these lines and Candidate of Medical Sciences A. L. Maksimov conducted investigations to study the functional state of the crew of the alpine station Vostok. It was determined that our technique permits prediction of the work capacity and level of resistance to oxygen deficit with a sufficiently high degree of confidence only during the initial period of stay under severe conditions. Cardiovascular- and respiratory-system parameters are best used to evaluate the human potential to resist unfavorable natural factors for a short time (one to two months). And data on the functional potential of the central nervous system are more reliable in forecasting long-term outcomes.

In this connection, we have begun to develop a comprehensive method for forecasting the work capacity of man. It incorporates a determination of a whole series of physiological and biochemical parameters, an evaluation of the individual properties of the central nervous system and personality characteristics.

The development of the comprehensive forecasting method is closely related to the study of the body's reserve potential. The body's reserve potential can be represented in the form of a pyramid, at the base of which lie biological and at the apex, sociopsychological factors, capable of stimulating, regulating, intensifying and organizing the utilization of the biological reserves.

Our investigations demonstrated a high degree of correspondence between biochemical and physiological criteria characterizing the resistance of man to oxygen deficit. It was shown that interpersonal relationships in a most direct manner affect the work capacity of a group located for a long period under extreme conditions. And the correct, scientifically-based formation of a working group is one of the main tasks of physiology and medicine.

A wide and deep ooverage of various functional levels of the human body permits us to predict the degree of the body's reliability upon confronting unfavorable extreme influences and to implement a qualitative selection of persons sent to regions with extreme environmental conditions.

Our republic also has such areas. For example, the Sary-Dzhaz region, where a new territorial-productional complex is under development. It seems to us that only a comprehensive evaluation of sociopsychological, physiological, biochemical and other human functions will be sufficient for selecting workers for this complex. And we consider the creation of a special scientific-medical center as necessary for solving this social task. This center could also be entrusted with the job of selecting the ranks of the student construction detachments sent to extreme climatogeographic regions.

It can be admitted that the prognostic direction in modern physiology and medicine, with its own subject and specific methods of investigation, has come into its own. Without a doubt, this direction will continue to develop in accordance with the collective needs of a society actively exploiting new territories of the earth, the expanses and depths of the world's ocean and the near and far reaches of outer space.

9942
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UDC 616:8-057-092:612.017.2]1:613.68

ADAPTATION OF PSYCHONEUROLOGICAL SPHERE IN CREWS OF MARINE AND RIVER FLEET TO VOYAGE CONDITIONS

Moscow SOVETSKAYA MEDITSINA in Russian No 8, Aug 82 pp 80-81

[Article by Candidate of Medical Sciences Yu. L. Zabin]

[Text] The intensive development of the national economy requires continuous improvement of the work of all forms of transport, an important place in which is assigned to the marine and river fleet.

During the years of the 9th and 10th Five-Year Plans the marine and river fleet was supplemented by highly-economical, universal specialized vessels with a complex control automation by main mechanisms and systems and became one of the most rapid and technically-improved fleets in the world.

Along with the traditional factors impacting on the sailor's body (change in climatic zones and time belts, noise, vibration, rocking), the broad introduction of autmation in the fleet and the increase in the duration of voyages introduced qualitative changes in the practice of the work of shipmen of various professions.

Stresses on the neuropsychological sphere particularly increased. Although neural-disease morbidity with temporary loss of work capacity of shipmen on the average for RSFSR water basins stabilized in recent years, a small increase was noted relative to 1974.

According to data of the Baltic water basin, diseases of the peripheral nervous system, vegetovascular dystonia and neuroses are predominant in the structure of morbidity (on the basis of physician usage).

The constant action on shipmen of a complex of physical, chemical, psychological and social factors makes high demands on their adaptive potential. An extended stay in the zone of action of these factors, which are combined with a considerable productional stress, increases the probability of a break in adaptation and the appearance of pathological responses. A medical examination of about 500 ship workers conducted in an RSFSR water basin made it possible to gain an understanding of the action of individual factors on

their psychoemotional state during a voyage. Of those questioned, 78% noted that the physical stress periodically encountered during voyages troubles them little and 63% had no complaints about the monotony of work and life during a voyage. At the same time, from 58 to 78% of those questioned asserted that the main difficulty in staying on a voyage is the irregularity of rest and family visits and separation from the Motherland, friends and acquaintances. Of those questioned, 55% had sleep disturbances during a voyage. However, most ship workers (about 70%) announced that they love their work and would not want to change jobs.

A change in the functional state of ship workers should be regarded as a natural response to the complex of factors acting during a voyage. Prophylactic measures should be implemented in two directions: on the one hand, to lower continuously the unfavorable influence of factors of the external and ship s, here and, on the other, to enhance the direct and readaptive potential of the human body.

The solution of these questions was promoted by such organizational measures conducted during the last two decades by the RSFSR Ministry of Health as the transfer of ship physicians from the jurisidiction of sanitary-epidemiological stations to the authority of therapeutic-prophylactic institutions, the creation in a number of basins of permanent physician inspection commissions incorporating psychoneurologists and the development of new rules for medical examination of shipmen, the staffing of ship medical points with physician cadres and their significant restocking with medical equipment. The number of neurological beds in the therapeutic-prophylactic institutions serving the employees of the RSFSR water basins nearly doubled during the last five years; neurological departments for 40-60 beds have been established in central hospitals. The dispensary examination of shipmen is conducted in all therapeutic-prophylactic institutions of the RSFSR water basins. "Floating" polyclinics are used to improve the therapeutic-prophylactic care of shipmen in a number of river basins.

An important role in raising the resistance of the sailor's body to the unfavorable factors acting upon it under voyage conditions is played by the sanitary-prophylactic clinics of the shipping professional unions. Today such therapeutic-prophylactic institutions have been created in 60% of the RSFSR water basins. Most of them are housed in model buildings constructed according to modern designs and well equipped with physiotherapeutic apparatus, possess water-mud clinics and are adequately staffed withhmedical cadres. Sanitary-prophylactic clinics operate according to an uninterupted schedule. An analysis of the effectiveness of the work of these therapeutic-prophylactic instituions indicates the great potential for improving the health of the contingents sent to them. The proportion of patients released with improvement after treatment reaches 80%. Patients with diseases of the nervous system comprise on the average about 30%. At the same time, the sanitary-prophylactic clinics are not widely used by shipmen for prophylactic therapy in all water basins. Thus, ship workers comprised only 12% of the patients undergoing treatment in the Murmansk sea basin, while in the Irtysh river basin, where there are considerably fewer workers, they comprised 40%.

The role of the chief central-hospital specialists in the organization and control of the therapy process still remains weak. There are no forms of specialization of advanced training for the medical personnel of these therapeutic-prophylactic institutions.

In the future the sanitary-prophylactic clinics should become a base for the psychophysiological preparation of sailors heading out to sea for the first time and for the readaptation of shipmen returning from long voyages. For this purpose, such institutions should be well equipped and reinforced by the appropriate specialists, primarily psychologists.

A number of scientific research institutes are involved with individual questions in the adaptation of shipmen; however, well-defined, scientifically-based recommendations for the adaptation of the neuropsychological mechanisms of sailors, who exist in a continuously changing environment, remain to be elaborated. The solution of these questions could appreciably facilitate the maintenance of the health of marine- and river-fleet ship workers and the elevation of their work capacity.

9942
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EXPERIMENTAL STUDIES ON MAINTENANCE OF AN ENZOOTIC STATE BY ATYPICAL PLAGUE BACILLI IN TYAN SHAN NATURAL NIDUS

Frunze ZDRAVOOKHRANENIYE KIRGIZII in Russian No 6, Nov-Dec 82 pp 13-17

KAZAKBAYEVA, R. A., Kirghiz Antiplague Station

[Abstract] Attempts were made at experimental establishment of an enzootic state in marmots in the Tyan Shan area by using atypical plague bacilli isolated in other localities and different virulence from strains typical to the Tyan Shan area. All attempts were unsuccessful either because of low virulence for the marmots or inability to induce bacteremia, indicating that only the plague bacilli that had undergone evolutionary adaptation to the marmots were capable of sustaining an enzootic state.
[221-12172]

CURRENT AND FUTURE PRACTICAL APPLICATIONS OF GENETIC ENGINEERING

Tbilisi ZARYA VOSTOKA in Russian 1 Feb 83 p 4

[Article by Doctor of Biological Sciences Tomas Tikhonenko, deputy director of the Virology Institute imeni D. I. Ivanovskiy, USSR Academy of Medical Sciences, in the column "Horizons in Science and Technology": "Genetic Engineering--the Reality of the Scientific-Technical Revolution"]

> [Text] The scientific-technical revolution now underway is characterized by close relations between science and production. The movement in a practical direction has also involved biology. This is borne out by the microbiological industry arising in the last decade, the wide industrial use of biological catalysts, the successes in the breeding of antibiotic producers and other useful microorganisms and the biological methods for combating agricultural pests. This trend is most pronounced in the development of a new scientific-practical branch--biotechnology, which represents an organic fusion of technical biochemistry, microbiology and genetic (gene) engineering.

Genetic engineering has developed with particular intensity. A recent outgrowth from molecular biology and genetics, genetic engineering has had considerable influence on biology, medicine and the microbiological industry. It can be defined as a system of experimental techniques making it possible by laboratory means to create artificial genetic structures in the form of so-called recombinant (hybrid) DNA molecules. In so doing, the reproduction of a number of key genetic processes is carried out at the molecular level, in contrast to classical genetics and breeding. That which in nature is the privilege of the intact organism has become an operation that is feasible in the laboratory with a cell or molecules. Recombination, that is to say the process and result of the combination of genes into a new assembly, occurs in the test tube according to the choice and will of the experimenter.

In our nation, genetic engineering has taken the path of practical application. This occurred with unusual rapidity if one considers the youth of this direction in science. Results have already been obtained that make it possible to speak of the practical effect of genetic engineering. And this is only the beginning.

Apparently, great changes will occur first in medicine. Genetic-engineering methods, for example, present the prospect of a radical improvement in vaccinal-serum work. Vaccines are now prepared from killed or attenuated microbes or viruses. The microorganisms comprising the vaccine cannot, in theory, reproduce but can evoke the production in man of specific antibody proteins. However, this traditional method has its deficiencies. And what is more, the cost of vaccines obtained in this manner is sometimes very high. Vaccination with pure viral coat proteins is far more reliable and safe. These proteins cannot reproduce in the organism, as can intact microorganisms; but antibodies are nevertheless produced against them. By inserting the genes for viral coat proteins into plasmids (independent genetic elements existing appart from the chromosomes), pure viral antigens--an ideal material for vaccination--can be obtained in large quantities.

During the last two years, Soviet scientists have created recombinant plasmids bearing the genes for a number of thepproteins of influenzal viruses and adenoviruses; they have obtained complete or partial DNA copies of the genomes (the aggregates of chromosomes) of such viruses as poliomyelitis, smallpox, tick encephalitis and so on. Special attention here is, of course, given to influenza, the economic cost of which is vast.

A further application of genetic engineering in medicine is the isolation of recombinant DNA's capable of being incorporated into the genome of animals. Genetic defects, including human hereditary diseases, can be corrected by introducing integral, functioning genomes into the genome of defective cells. The prospects for treating genetic diseases are highly realistic if one considers a number of hopeful results obtained by Soviet researchers during the last two years in a study of blood diseases of the thalassemia type and Wilson-Konovalov disease.

Soviet scientists hope to solve in a similar manner the nitrogen-fertilizer problem in agriculture. It is extremely important to compel such cultivated plants as wheat or corn to assimilate atmospheric nitrogen. For nitrogen fertilizers are expensive and are poorly assimilated by plants. A considerable portion of these fertilizers is broken down by soil microorganisms or leached into bodies of water, where they are transformed into dangerous nitrates and nitrites--carcinogenic substances--in large concentration.

A way out of this situation is suggested by leguminous plants, which live in symbiosis with nodule bacteria capable of assimilating nitrogen directly from the atmosphere. Therefore, intensive work is now underway for transferring the groups of genes responsible for atmospheric-nitrogen binding into other species of soil bacteria. There is also a project to transfer these genes directly into plants. Solving the problem of the biological replacement of nitrogen fertilizers will undoubtedly have a vast economic effect.

Genetic-engineering methods can also be used in the microbiological synthesis of scarce proteins of animal origin, including food and fodder proteins. These methods provide the possibility of producing certain amino acids that

are available in plant products in limited quantities. For example, it is known that adding 0.1-0.3 percent of the scarce amino acid threonine to animal feed increases the animal weight gain by 15-20 percent. Soviet scientists using genetic-engineering techniques have thus reorganized the metabolism of the Escherichia coli bacterium, which increased by many-fold its capacity to synthesize threonine. As a result, a cheap raw material was obtained for producing this amino acid.

Of great importance in the interests of environmental protection is the construction by genetic-engineering methods of microorganisms transforming industrial and sewage wastes. Bacterial strains have already been obtained on the basis of recombinant-DNA technology that effectively break down petroleum and can serve as a means for combatting water pollution by petroleum. Experiments are underway for the creation of new species of recombinant microorganisms capable of breaking down synthetic polymer materials that are resistant to natural action.

Finally, investigations have begun in the field of genetic engineering that are designed for the distant future and which today may seem almost fantastic. As examples of such work one can cite projects for the industrial production of hydrogen using photosynthetic bacteria, the creation of a molecular diode of microbiological origin designed to serve as the elementary unit of the ultramini computers of the future and so on. Here genetic engineering intrudes upon traditionally-nonbiological spheres of human activity.

9942
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TRICARBOXYLIC ACID CYCLE AND THE GENETIC CODE

Moscow BIOFIZIKA in Russian Vol 28, No 1, Jan-Feb 82
(manuscript received 31 Mar 82) pp 133-134

NIKOL'SKIY, Yu. K., Kurgan Scientific Research Institute of Grain Growing

[Abstract] Application of quantum mechanical calculations of the energies of interaction of nitrogenous bases in DNA triplets led to the division of the various codons into two distinct groups: Group I is characterized by interaction energies of 36-40 kcal/mole per base pair, and encompasses 32 codons covering eight amino acids (tryptophan, proline, glycine, threonine, serine, arginine, cystine, alanine); Group II has interaction energies of 21-22 kcal/mole per base pair and encompasses the remaining 32 codons and 12 amino acids (methionine, isoleucine, tyrosine, histidine, glutamine, leucine, asparagine, lysine, phenylalanine, valine, glutamic acid, aspartic acid). All but two of Group I amino acids enter the tricarboxylic acid cycle (TCA) via acetyl-CoA, and all but two of Group II amino acids enter the TCA directly via ketoglutarate, succinyl-CoA, fumarate, or oxalacetate. It appears, therefore, that the manner in which an amino acid enters the TCA is predicated on the interaction energetics of the bases of their respective codons. Figures 1; references 8: 5 Russian, 3 Western.
[266-12172]

UDC 577.21

TRANSPORT OF β-LACTAMASE GENE BY ARTIFICIAL VIRUS-LIKE PARTICLES INTO HUMAN CELLS AND ITS EXPRESSION

Yerevan BIOLOGICHESKIY ZHURNAL ARMENII in Russian Vol 35, No 9, Sep 82
(manuscript received 5 Apr 82) pp 730-734

ZAKHARYAN, R. A., GASPARYAN, E. T. and APOSHYAN, G. V., Institute of Experimental Biology, Armenian SSR Academy of Sciences

[Abstract] A DNA segment (3.5×10^6 daltons) was obtained from plasmid pBR 322 genome by treatment with restrictases (Eco RI, Bgl, Bam HI), which

contained the ß-lactamase gene (BLG). The fragment was incorporated into preformed polyoma capsids in the presence of histones, and the resultant polyoma-like particles (PLP) were used for the infection of a human cancer line (CaOV). Subsequent testing of the cells showed the expression of BLG in the form of ß-lactamase activity, with the appropriate controls remaining negative. The use of PLP appears to be a promising approach for the introduction of foreign genes into human cell lines that exceeds the calcium-phosphate and liposome methods in efficiency. Figures 2; references 10 (Western). [249-12172]

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LASERS IN THE TREATMENT OF PRIMARY GLAUCOMAS

Moscow VESTNIK OFTAL'MOLOGII in Russian No 6, Nov-Dec 82 (manuscript received 4 May 82) pp 19-24

[Article by V.S. Akopyan, candidate of medical sciences, All-Union Scientific Research Institute of Eye Diseases, USSR Ministry of Health, Moscow]

[Text] Despite unquestionable advances in the study of glaucoma, therapy remains an unresolved issue. Trabeculoectomy remains the most popular surgical treatment of glaucoma; with some reservations it can be regarded as within the province of microsurgery and, because of the simple techniques involved, it is extensively employed. The role of drug therapy has changed little in recent years, despite some advances in chemotherapy (primarily, the use of Timolol).

In view of this, it is quite understandable that there should be considerable interest in the application of lasers to the treatment of glaucoma since this avenue opens up a fundamentally new approach [Krasnov, 1972, 1980; Hager, 1973; Wise and Witter, 1979; Wise, 1981]. Even at the present level of development this method is noted for a variety of approaches and technical innovations, and different indications.

This communication is concerned with a systematic presentation of currently available laser methodology for the treatment of primary glaucoma. It is based largely on twelve years of experience at the Special Problems Scientific Research Laboratory of Eye Microsurgery and the All-Union Scientific Research Institute of Eye Diseases of the USSR Ministry of Health. In that period of time more than 3500 patients were subjected to laser therapy. We shall concentrate on the principles underlying the clinical application of various lasers and their comparative evaluation.

Technical Aspects of Laser Therapy in Glaucoma

The effectiveness of lasers in the treatment of glaucoma depends largely on advances in laser instrumentation and their specific application to various forms of the disease. The selection of the emission source is of primary concern. We are in the process of investigating two diametrically opposed forms of laser generation for the treatment of glaucoma:

short-pulse (on the order of 10^{-8} sec) emissions from solid-state lasers (high-power pulses) and continuous output argon lasers (lasting for tenths of a second). The first type is represented by the Soviet Yatagan ophthalmological laser created under the directorship of Prof. M.M. Krasnov. The second type is widely distributed and represented by argon photocoagulator laser models 800 and 900 manufactured by Coherent Radiation Co. (USA). In the case of the continuous output lasers thermal effects predominate at the tissue level, and all the antiglaucomatous effects of this type of laser are based on coagulation. The high-power pulse lasers are characteristically lacking in thermal effects and, consequently , coagulation is at a minimum. They induce perforations or "micropunctures" in tissues, an effect which is used therapeutically in glaucoma. Success of such procedures also depends heavily on certain other physical parameters of laser emission, such as the diameter of the focal point and the pulse energy. These factors also determine the effectiveness of coagulation or perforation. Bass et al. [1977] have demonstrated that pulses with high focal power density can induce micropunctures in the iris after exposure to a single pulse. Furthermore, the laser wavelength is of secondary importance. Our studies on the effects of high-power pulses on the transparent media of the eye have shown that it is possible to induce perforation of nonpigmented targets [Akopyan, 1975]. This made it possible to consider the use of this type of laser in the management of open-angle glaucoma with nonpigmented trabeculae and Schlemm's canal.

A second extremely important factor in the technical aspects of laser instrumentation is the quality of the optics through which the laser emission is delivered to the target tissue, particulalry in the case of open-angle glaucoma. For a long time M.M. Krasnov has successfully used a goniolens borrowed from surgery; its primary shortcomings are a limited angle of view of the anterior chamber and instability of the optical material (sapphire, glass K-8, etc.) when exposed to high-power lasers. It was only after a modified polymethylmethacrylate (developed jointly by the Physical Institute of the USSR Academy of Sciences, the Scientific Research Institute of Organic Products and Dyes, and the All-Union Scientific Research Institute of Eye Diseases) had received official approval that it became possible to design laser-stable optical details for the introduction of laser emissions into eyes. This factor improved the quality of laser management of glaucoma which relied on high-power pulses. Standard goniolenses and prisms continued to be used for the delivery of continuous laser output into the cavity of the eye.

Closed-Angle Primary Glaucomas

Iridectomy continues to be important in the treatment of closed-angle glaucomas. Its primary intent is to eliminate relative pupillary blockage , the role of which in the blockage of the anterior chamber angle is well recognized. The effectiveness of laser iridectomy is due to two basic factors: an anatomical effect consisting of a perforation

of the iris and a physiological effect consisting of hypotension. The anatomical consequences do not of necessity guarantee hypotension, but an anatomical lesion of this type is a prerequisite for hypotension.

The first communication on the effectiveness of laser iridotomy in the treatment of closed-angle glaucoma belongs to Perkins and his colleagues [1968-1973]. Using a short-impulse ruby laser operating in a free generation mode, and subsequently dye laser pulses, Bass et al. [1977] achieved a high percentrage of successful iridectomies and found dye lasers to be especially advantageous. An anatomical effect consisting of an iridotomy can be achieved with a single pulse.

In the USA, where the ophthalmologists generally utilize an argon laser photocoagulator, iridotomy is achieved by "burning through" the iris membrane. Abraham [1975], for example, uses a single high-power pulse (up to 1250 mW) up to 5.0 sec in duration to perforate the iris; this technique requires akinesia and retrobulbal anesthesia. Pollack [1980] uses even more powerful lasers (up to 2 W) in combination with minimal exposures for an argon photocoagulator and feels that this combination is most effective.

At the All-Union Scientific Research Institute of Eye Diseases Prof. M.M. Krasnov led studies , which began in 1973, which compared various methods of laser iridotomy. The studies utilized a ruby laser operating under conditions of passive modulation of quality (the studies initially employed a prototype instrument and subsequently the commercially produced Yatagan instrument). The second instrument which was tested was the argon laser photocoagulator. Three different methods of laser iridectomy were compared: 1) Laminar iridectomy (argon laser), 2) Combined iridectomy (successive use of argon and ruby lasers), and 3) Single-impulse iridectomy (high-power pulse laser).

Laminar iridectomy required several sessions (1-5) with at least a 14 day interval between treatments. The primary shortcomings of this approach are: a) a 34% anatomical failure rate, b) the duration of time needed for an anatomic effect, and c) prolonged low-grade asymptomatic iridocyclitis with proliferation of the pigmented epithelium terminating in the formation of posterior planar synechiae in 50% of the cases.

Combined iridectomy requires far fewer sessions. The time required for the formation of a coloboma is much shorter. This method assures the highest anatomical success rate (93%) with a significantly lower incidence of iridocyclitis (25%).

Both of the above methods of iridectomy are based on the same principle. The initial laser coagulation sessions lead to the formation of a focus of coagulation necrosis and stromal atrophy. The final treatments lead to perforation of the residual stroma and the posterior pigmented layer. Quality modulated pulse lasers are far more effective in the final stage of treatment.

One-time iridotomy has become possible because of advancements in the optical properties of the laser pulse. A decrease in the diameter of the focal point and a concomitant increase in the focal power density favor complete penetration of the entire thickness of the iris. In our hands this approach ensures a coloboma with a single pulse in 70% of the cases. The incidence of this anatomic lesion increases to 91% if the single-pulse treatment is repeated within two weeks of the unsuccessful first attempt. We have not encountered iridocyclitis with this type of laser iridectomy.

Various technical modifications of laser iridectomy were employed in 2004 patients (3384 eyes) in the Department of Laser Therapy at our Institute in the treatment of closed-angle glaucoma.

The hypotensive effects following a successful laser iridectomy show some variation; to a large extent hypotension depends on the extent of secondary changes in the angle of the anterior chamber and in the draining system of the eye, which may be categorized as insidious and apparent. Goniosynechiae fall into the latter category. Insidious changes find their manifestations in damage of the eye's draining system without synechial obliteration of the iridocorneal angle.

Our studies have shown that complete normalization of intraocular pressure occurs after iridectomy if goniosynechiae (functional blockage of the angle) are absent or only a few in number. In this category of patients full normalization of intraocular pressure was seen in 51.8% of the cases after discontinuation of chemotherapy. In the remaining patients (48.2%) normal intraocular tension was maintained after iridectomy by a combination of miotics and adrenergic agents.

When the iridocorneal angle is blocked largely by synechiae laser iridectomy does not, as a rule, lead to normal intraocular pressure although this type of treatment is worthwhile in the treatment of such blockage.Drug therapy is also ineffective in most cases. Following laser iridectomy all of these patients had to undergo surgery sooner or later.

For the last two years randomized trials were conducted at the All-Union Scientific Research Institute of Eye Diseases of the USSR Ministry of Health on the comparative effectiveness of laser and surgical iridectomies which will, hopefully, help resolve the question of which treatment modality is superior. The final results will be analyzed after five years of investigation.

A not insignificant use of laser iridectomy is its possible use as a prophylactic modality in the "second" eye after an acute attack in the "first" eye.

Primary Open Angle Glaucoma

Two different type of laser interventions have been employed to date in open angle glaucoma: perforating [Krasnov, 1972; Hager, 1973; Worthen and Wickham, 1974] and tractional [Krasnov, 1978; Linnik, 1978; Wise and Witter, 1979; Wise, 1981]. Initially, laser treatment of open angle glaucoma was based on improving drainage by perforation of the trabeculae and the internal wall of Schlemm's canal. The quality modulated lasers used by Krasnov [1974, 1977] for this purpose (laser goniopuncture) were found to be far more effective than analogous treatment with argon laser (laser trabeculopuncture) [Hager, 1975]. The adherents of each of these methods noted that the decrease in ocular pressure after a single treatment was essentially identical--about 10 mmHg. However, the duration of the effect was much longer with goniopuncture (2.2 years on the average [Litvinova, 1978]).

In order to improve the effectiveness of the "thermal" laser trabeculopuncture we used additional means, such as proteolytic enzymes [Polunin and Akopyan, 1978] and procedures such as blood reflux in Schlemm's canal [Akopyan and Karetnikova, 1977]. This made it possible to prolong the mean duration of hypotension achieved with a single trabeculopuncture to 2.5 years [Akopyan and Litvinova, 1982].

Further improvements in the laser-induced perforations involved measures intended to prolong laser exposure on the entire area of Schlemm's canal by means of special laser-stable optical elements (vide supra), and by more accurate localization of the puncture in relation to the position of the opening of the collectors of Schlemm's canal [Akopyan, 1981]. These modifications represented special adaptations of the existing methods to meet the variability encountered in open angle glaucoma. It needs to be emphasized that the duration of the resultant hypotension was essentially identical with all the methods employed to secure a puncture (approximately 10 mmHg for about 2 years).

The first attempts at a laser therapy that was more sparing of the draining system were the efforts of Krasnov [1978], Linnik [1978], and Wise and Witter [1979]. Laser coagulation of the anterior portion of the ciliary body (designated as cyclotrabeculospasis by M.M. Krasnov) is intended to induce scar-mediated traction from the scleral spur which is intimately bound to the trabecular apparatus. Wise's method is based on direct laser-induced coagulation of the trabeculae (trabeculoplasty). Both methods rely on increasing the tension on the trabeculae and increasing their permeability by widening the intertrabecular spaces. In addition, both authors feel that diminishing the circumference of the trabeculae eliminates collapse of Schlemm's canal in cases with such a complication. At the present time extensive comparative studies are being conducted at the All-Union Scientific Research Institute of Eye Diseases on Krasnov's cyclotrabeculospasis and Wise's trabeculoplasty. The preliminary findings have shown that both methods have unquestionable advantages. A mean hypotensive effect of 14 mmHg is attained. The duration of such compensation is being followed and, to date, not one of the 100 cases has presented with

recurrent ocular hypertension after 0.5 to 1.5 years of follow-up [Krasnov et al., 1982]. Only careful comparative clinical investigations will reveal the advantages and disadvantages of each method and permit an evaluation of their place in the treatment of glaucoma.

In summarizing our ten years of experience with laser therapy of open angle glaucoma one principal factor has to be emphasized. The usefulness of a given approach or of a given laser method depends on the anatomical and physiological characteristics of Schlemm's canal, the width of the iridocorneal angle and its various other features, and the extent of pathology afflicting the ocular drainage system. However, even now it is possible to list certain guidelines for the selection of a given laser methodology. One of the factors pertains to the width of the iridocorneal angle. A wide angle with sharply demarcated and accessible anterior part of the ciliary body lends itself to the so-called anterior cyclocoagulation, i.e., cyclotrabeculospasis. However, in the case of eyes in which the anterior part of the ciliary body is masked by the angle of the anterior chamber but the trabecular zone is accessible, "pure" trabeculoplasty can be utilized, i.e., coagulation of the scleral spur or of the trabeculae.

Another important factor which determines which approach is to be used is the degree of pigmentation in the zone of Schlemm's canal and the trabeculae. In the case of strong pigmentation goniopuncture, trabeculopuncture, or trabeculospasis are equally applicable. Strong absorption of the laser pulse by the melanin favors both an intense burn and penetration. Moderate pigmentation presupposes different methods ranging from perforations to tractions. In the absence of pigmentation Schlemm's canal can be localized by induced blood reflux in to the sinus. The nature of the reflux can also provide information on the extent and severity of changes in the draining system. Orbicular filling of the canal with blood indicates retention of circulation, a factor of importance in the selection of the site of laser application and the outcome. In situations in which the sinus is filled it is possible to use trabeculopuncture with proteolysis and trabeculoplasty. Segmental or "point" filling of the canal with blood indicated a poor prognosis since it suggests organic blockage of the sinus. In such situations goniopuncture is indicated with chamber-collector anastomosis.

Ten years of investigation have shown that it is unlikely that a universally applicable form of laser therapy for open angle glaucoma will emerge. In view of this, it is important to develop highly reliable criteria for the differential diagnosis of the different forms of open angle glaucoma. The selection of the appropriate laser technique must rest on an accurate diagnosis.

Further developments in this area must deal with the problems pertaining to the relationship between induced hypotension and the duration of treatment, synergism and antagonism between laser therapy and drug treatment, and the establishment of impartial criteria for the evaluation of laser therapy. A solution to these and a number of other

problems will promote a better appreciation of the uniqueness of laser therapy and may alter many traditional views on the treatment of glaucoma.

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EXPERIENCE WITH HELIUM-NEON LASER IN TREATMENT OF CERTAIN EYE DISEASES

Moscow VESTNIK OFTAL'MOLOGII in Russian No 6, Nov-Dec 82 (manuscript received 2 Jun 82) pp 70-71

[Article by Prof. G.A. Ul'danov, Kazakh Ophthalmological Scientific Research Institute]

[Text] In recent years considerable attention has been accorded in biology and medicine to the so-called biostimulatory effects of low-energy emissions of helium-neon lasers [Inyushin, 1967, 1970; Inyushin and Chekurov, 1975; Korytnyy, 1979; Rakhishev, 1977; others]. In particular, enhancement of repair processes has been noted in the case of cutaneous, bony, and nervous tissues.

In ophthalmology helium-neon lasers are used primarily for the stimulation of macula lutea in disbinocular amblyopias and macular dystrophies [Linnik et al., 1971, 1977, 1978, 1979, 1981, 1982; Avetisov et al., 1975; Semenov et al., 1979; Fedorov et al., 1979, 1981; Yeroshevskiy et al., 1981; Krasnov et al., 1982; others]. Individual communications also deal with attempts at laser therapy of certain inflammatory conditions (keratitis, iridocyclitis) of the anterior eye [Maychuk et al., 1977; Semenova et al., 1982].

Studies on the clinical use of low-energy helium-neon lasers commenced at the laser laboratory of the Kazakh Unified Scientific Research Institute of Ophthalmology in 1975. These investigations are conducted with Soviet instruments (LG-75, LG-380, OG-78, and LG-523). Using these emitters, ophthalmological laser instruments have been designed which are specifically intended for irradiation of the anterior and posterior portions of the eye (innovation certificates No. 30, Aug. 24, 1976, and No. 135, Nov. 2, 1981).

The experimental and clinical studies have resulted in the development of an optimal, standardized, and easily followed course of laser therapy. The entire course of therapy consists of 10-15 daily sessions with 1 min exposure during the first three sessions and two min exposures thereafter.

Experimental studies showed that the sensitivity of the cornea was reduced in 75% of the cases after a single irradiation, based on nine point measurements conducted with a Radzikhovskiy algesimeter. Analgesia persisted for five minutes after exposure.

Experiments were conducted on 20 2.5-2.8 kg chinchilla rabbits to determine the effects of helium-neon laser on wound healing of cornea with standard penetrating wounds (induced after the removal of Harderian and tear glands) after microsurgical PKhO [expansion unknown].

The resultant data were compared with the data obtained for an appropriate control group of animals. The experimental animals, in whom the eyes were treated with the helium-neon laser, presented with earlier (by 2-3 days) epithelialization, a more moderate course of traumatic iridocyclitis (weakly expressed corneal syndrome), and accelerated scar healing (5-7 days after trauma). Furthermore, scar formation was accompanied by profuse corneal vascularization.

Clinically, the helium-neon laser was used in 40 cases with penetrating injuries of the cornea and the sclera. Immediately after the procedure all patients reported a feeling of warmth in the irradiated eye. Objectively, this was accompanied by enhanced pericorneal injection and gradual (after 4-5 sessions) decrease in ciliar pain. In comparison with a control group, all the patients presented with almost complete consolidation of the scar and more pronounced corneal vascularization.

Laser therapy was also applied in 45 cases (45 eyes) with corneal ulceration. Marked attenuation of the corneal syndrome was noted with concomitant clearing and epithelialization of the ulcer without accompanying neovascularization.

The same procedure was applied in 60 cases (60 eyes) after surgery for retinal detachment to insure photostimulation of the macula lutea. After 3-4 sessions macular edema disappeared completely and the transparency of the vitreous body increased. As a result, a significant acceleration in the recovery of vision was seen.

Examination of the patients one year after irradiation showed superior functional parameters in comparison with the control group (such as visual acuity and field of view, macular tests, dark adaptation, KChSM and SPP [expansions unknown]).

Consequently, our studies have demonstrated the analgesic, vasodilatatory, and biostimulating effects of low-energy lasers. There is need for further studies on the therapeutic potential of lasers in the combined therapy of various diseases of the anterior and posterior segments of the eye.

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MECHANISMS OF PHOTODECOMPOSITION OF GUANOSINE-5'-MONOPHOSPHATE UNDER THE ACTION OF VACUUM AND LASER UV-IRRADIATION

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(manuscript received 6 Jun 81; in revised form 25 Aug 81) pp 14-17

DODNOVA, N. Ya., REMIZOVA, L. A., TSYGANENKO, N. M. and NIKOGOSYAN, D. N., Scientific Research Institute of Physics, Leningrad State University imeni A. A. Zhdanov; Institute of Spectroscopy, USSR Academy of Sciences, Troitsk (Moscow Oblast)

[Abstract] Comparative studies were conducted on the mechanisms of photodecomposition of guanosine-5'-monophosphate (GMP) by UV irradiation in vacuo (300 W H_2 lamp, 120-170 nm) and in aqueous solutions by UV Nd:YAG laser (266 nm). In addition, studies were also conducted with γ-radiolysis using Cs-137 and Co-60 sources. TLC analysis of the products obtained under the various conditions showed that in vacuo UV irradiation led to direct disruption of the N-glycoside bond. In the case of γ-radiolysis and UV laser irradiation direct decomposition of GMP did not occur; photodecomposition was indirect and mediated by free radicals formed from the dissociation of water (H, OH, e^-, etc.), resulting in the formation of guanine, formamidopyrimidine ribotide, and other products, although direct dissociation of GMP cannot be absolutely excluded. Figures 1; references 13: 8 Russian, 5 Western.
[266-12172]

SELECTIVE ACTION OF RUBY LASER ON THE PIGMENT APPARATUS OF HIGHER PLANTS

Moscow BIOFIZIKA in Russian Vol 28, No 1, Jan-Feb 82
(manuscript received 10 Aug 81; in revised form 15 Feb 82) pp 45-49

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[Abstract] Investigations were conducted on the effects of ruby laser irradiation (694.3 nm) on the low-temperature (77°K) fluorescence of pea

chloroplasts and subchloroplast particles containing various pigmented components of the photosynthetic apparatus. The selective action of the ruby laser on the pigmented components was indicated by the fact that only fluorescence at 730 nm was diminished in the case of the active center of photosystem I when the threshold power density of the laser was exceeded ((5-8) x 10^{10} $W.m^{-2}$). It appears that the pigmented components of photosystem I which fluoresce in the 750-760 nm range function as sinks for excess energy of excitation in this system. The pigmented components of photosystem II did not undergo any spectral changes even when the intensity of irradiation was increased to 10^{12} $W \cdot m^{-2}$, indicating that not all native forms of chlorophyll absorb at 694.3 nm. Figures 3; references 16: 10 Russian, 6 Western.
[266-12172]

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EFFECT OF FUR ON TURBULENT FLOW IN A TUBE

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 268, No 3, Jan 83
(manuscript received 5 Jul 82) pp 727-731

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[Abstract] The hydromechanical properties of sealskin (Callorhinus ursinus) were investigated under in vitro conditions in which 35 mm diameter tubes were lined with the sealskin for determination of the coefficient of resistance (λ) to water flow. The results showed that in the case of the sealskin lining λ showed greater dependence on Reynolds number than in the case of unlined tubes, and that the former had greater absolute resistance (λ = 0.16) than did the unlined rough tubes (λ = 0.14). It appears that, under the experimental conditions employed, the sealskin behaves hydrodynamically as a very rough surface, although the relationship of these observations to in vivo situations remains to be determined. Figures 3; references 6: 5 Russian, 1 Western.
[218-12172]

HEALTH ASSESSMENT OF MEDICAL-DEMOGRAPHIC PROCESSES IN NARYN OBLAST

Frunze ZDRAVOOKHRANENIYE KIRGIZII in Russian No 5, Sep-Oct 82 (signed to press 14 Sep 82) pp 20-25

[Article by S.O. Orozaliyev, Chair of Social Hygiene and Public Health, Administration, Kirghiz State Medical Institute]

[Text] In this paper we attempt to provide a health assessment of the age-and-social structure and the indexes for natural shifts in life expectancy among the population of Naryn Oblast in the Kirghiz SSR.

The oblast population is made up mainly of people of Kirghiz nationality (96.1 percent). The oblast territory is relatively isolated from the republic's industrial centers. The economic base is livestock farming. Accordingly, in this oblast, demographic processes have their own specific features.

Population growth in Naryn Oblast is smaller than in the other oblasts and in the republic as a whole. This is because population growth is taking place exclusively through natural shifts.

Migration processes in the oblast are negligible. Thus, during the period 1926 through 1979 the oblast population increased by a factor of 2.2, while the average for the republic was a factor of 3.5.

The age structure of the population in Naryn Oblast differs substantially from that in other zones of the republic and Kirghizia as a whole. In 1979 the proportion of children noted in the population was large (47.8 percent), while the proportion of older individuals aged 15 to 49 (40.5 percent) and more than 50 (11.7 percent) was smaller than for Kirghizia as a whole, where these figures are 37.3, 47.2 and 15.5 percent respectively.

Analysis of three age-social indexes that are closely interconnected is of medical-social interest: in 1979 the proportion of the able-bodied population in the oblast was 34.0 percent*, matching almost exactly the figures for Kirghizia as a whole (33.6 percent), but considerably lower than for the USSR

* The proportion of the population aged 20-59 in the total population.

(38.9 percent). Compared with earlier periods this index has fallen in the oblast. In 1979 the coefficient of dependents[1] was 1.943, which is 1.5 times greater than for the republic (1,331). Within the oblast this process has taken place as a result of the high birth rate and increased life expectancy. The coefficient for population age[2] in the oblast has undergone certain changes: during the period 1926 through 1959 it increased substantially (from 6.4 percent to 11.7 percent), while from 1959 through 1979 it fell back to its initial level (6.5 percent). Compared with the republic index (8.1 percent) it is low. In 1979, according to the age coefficient the population of the oblast was in a state of demographic youth. In Kirghizia as a whole the population is at the first threshold of age (age coefficient 8.1 percent). These age and social indexes for the oblast are substantially different in urban settlements and rural localities. Thus, in the urban settlements the proportion of the able-bodied is higher than in the rural localities (40.9 and 32.5 percent respectively), and consequently in the former the coefficient for dependents (1,443 against 2,077) and also the age coefficient (3.3 percent against 7.2 percent) are also lower.

The age and social indexes cited depend on changes in the age structure of a population. We have analyzed changes in the age structure of the population in the oblast over the last 10 years.

The 1970 age structure for the population of Naryn Oblast indicates a dominance of young individuals. The proportion of individuals aged 0-19 points to a lower death rate among children and adolescents with the retention of a high birth rate. The proportion of individuals in the 20-29 age group, that is, individuals born during the Great Patriotic War period, is low; the birth rate fell sharply at that time. This also explains the very low proportion of individuals in the 50-59 age group; they "suffered" twice. These make up the cohort of individuals born at the beginning of the 20th century who lived through stormy revolutionary and military events, and were also participants in the Great Patriotic War.

Compared with 1970, by 1979 the age structure of the population has altered. The proportion of children aged up to 9 years had dropped substantially (32.7 percent), which was associated with the lower birth rate in the Seventies. The numbers of individuals in the 10-29 age group had increased to 40.1 percent, the result of the high birth rate during the Fifties and Sixties. And compared with the figures for the republic, in 1979 the proportion of children in the population was still high.

The sex composition of the population is of considerable medical and social significance. In 1979 the proportion of females in the population was 50.7 percent. This greater proportion of females was mainly in the older age

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1. The number of individuals aged 0-19 and more than 60 per 1,000 of the population aged 20-59.

2. The proportion of individuals aged 60 and above in the total population.

groups, the result of the loss of males during the Great Patriotic War. There was no disproportion among the sexes in the younger age groups.

One distinguishing feature of Naryn Oblast is the fact that individuals of Kirghiz nationality make up the absolute majority of the population (96.1 percent, while for Kirghizia the population is made up of 47.9 percent Kirghiz, 25.9 percent Russian, 12.1 Uzbeks and so forth. Within the oblast 82.5 percent of the population lives in rural localities. Accordingly, the Kirghiz here keep up the tradition of having many children to a greater extent than the Kirghiz living in other zones of the republic where the customs and traditions of other nationalities have their effect. This also explains, in particular, the features in the makeup and the processes of population renewal. Thus, Naryn Oblast is distinguished by a larger proportion of children in the population, which requires more services for the oblast population provided by pediatricians and pediatric hospital beds. Nevertheless, the need for these services in the oblast is less than the average for Kirghizia. In this connection, a "special index for pediatric needs" has been worked out (K.D. Abdullin, 1980), which takes into account the proportion of children in a population and is derived from the relationship between the index for pediatric needs as a percentage of the specific proportion of children in the population, that is:

$$X = \frac{\text{availability of pediatricians (per 10,000)}}{\text{proportion of children in total population (\%): 100}}$$

Thus, whereas in 1979 the availability of pediatricians in Naryn Oblast was 3.5 per 10,000, while it was 3.9 for Kirghizia (a difference factor of 1.1), the "special index for pediatric needs" was 7.5 and 10.5 repsectively (a difference factor of 1.4).

From the medical and social viewpoint, the sector and occupational structure of the population is significant. In 1979, of the total numbers of individuals engaged in the national economy of the oblast, 76.3 percent were working in the sphere of material production (the figure for Kirghizia was 76.0 percent), and 23.7 percent in the nonproduction sphere (24.0 percent for Kirghizia). Compared with the republic, within the oblast a smaller proportion of the population was engaged in machine building (4.0 percent) and in construction (3.3 percent) than the average for the republic (9.6 and 4.4 percent respectively). Within the oblast, individuals engaged in primarily physical labor made up three-fourths (74.5 percent) of all those working, while 25.5 percent of individuals were engaged primarily in intellectual labor. These indexes were the same as for the republic (74.2 and 25.8 percent respectively).

The large proportion of the rural population (82.5 percent) and of children among the population (47.8 percent) and the small proportion engaged primarily in intellectual work (25.5 percent) are not promoting enhancement of sanitation standards; while the low proportion of the able-bodied in the population and consequently the high dependent coefficient, is the reason that a larger load falls on the able-bodied population. These factors that we have listed are not without significance for the health of the population in general. They

to some extent make things more complicated and create additional difficulties in the work of the public health organs. However, the absence of major industries and the low proportion of individuals engaged in industry creates the preconditions for a lower incidence of disease typical of a locality with a developed industry (production poisoning, occupational disease and so forth). Nevertheless, there are no grounds for asserting that these diseases have been completely eliminated; this is associated with the increasing introduction of various equipment and noxious chemicals in agriculture.

Because of the relative stabilization of the death rate, in Naryn Oblast, as throughout the republic, changes in natural shifts in the population are determined mainly by the birth rate indexes. During the period 1975 through 1979 the birth rate in the oblast fell from 39.3 to 37.8 per 1,000, or by 4 percent. Within the oblast the birth rate index is high, occupying first place among the other zones of the republic. The high birth rate index in the oblast is the result of the high level of fecundity in marriages.

During this period the death rate fell 7 percent, a very low level.* In this period natural growth dropped slightly (3.0 percent) and remained at a high level. On the whole, the process of natural shifts in the oblast is developing favorably--a falling birth rate accompanied by a more intensive drop in the death rate.

As is known, general indexes for the death rate do not fully reflect the population's health status. And the age indexes do not provide a general aggregate of characteristics, while there are some "loose ends" in the presentation of the death rate for each age group. Accordingly, the index for the average life expectancy of the present population is a more reliable index providing a cumulative idea of the age indexes. During 1978-1979, within the oblast the average life expectancy for women was higher than for men (by 6.8 years), and for the urban population, higher than for the rural population (by 2.7 years).

In order to clarify the degree to which the main causes of death affect average life expectancy, using the method suggested by A.A. Merkov (1959) we first calculated the indexes for average life expectancy for the oblast population for 1978-1979, taking into account the number of cases of deaths from individual classes of causes of death. This established that given the elimination of death from diseases of the respiratory organs, average life expectancy for the population in the oblast would increase 4.6 years; given the elimination of deaths from diseases of the circulatory system, the figure would increase 3.3 years; and given elimination of death from accidents and cases of poisoning, the figure would increase 1.1 years. Hence, deaths from diseases of the respiratory organs exert the greatest effect on average life expectancy in the oblast population. Accordingly, the public health organs in the oblast should pay special attention to dealing with diseases of the respiratory organs.

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* "High" is greater than 15 per 1,000; "average" is 9-15 percent; "low" is up to 9 percent.

We also determined the indexes for average life expectancy for the different social groups in the oblast population for 1978-1979 (see table 1 below).

It can be seen from the table that average life expectancy for men engaged in production is higher than for those not so engaged. This is evidently explained by the fact that the nonworking contingent of men consists mainly of individuals who are frequently sick and who have poor health. A higher index for average life expectancy is also noted among men engaged in agricultural labor. The highest average life expectancy is among individuals with higher and incomplete higher education. The lowest indexes are seen among individuals with secondary education. This is evidently explained by the fact that individuals with higher education take greater care of their health and have higher sanitation standards. Average life expectancy is higher in married men that in widowers and divorcees, which is probably explained by the unstructured lifestyle of the latter.

Table 1. Average Life Expectancy in Various Social Groups in the Population Naryn Oblast 1978-1979.
(the employed population, the population with complete and incomplete higher education, and the married population are taken as 100)

Social Group	Average Life Expectancy	
	Men	Women
By sources of income and nature of work:		
Employed	100	100
including those engaged in:		
primarily intellectual work	98	103
primarily physical work	100	99
agricultural labor	110	100
Unemployed	51	95
By education:		
Complete and incomplete higher education	100	100
Secondary specialized education	92	98
Secondary general education	90	82
By family status:		
Married	100	100
Widowed and divorced	97	106

It can be seen from the analysis that the average life expectancy differs for the various social groups among the population; this is a reflection of the complex of factors affecting the health of population contingents aggregated within a given social group (labor, domestic situation, leisure, material status, culture, behavior, habits and so forth). Clarifying the degree to which these factors affect the health of a given population contingent is an important task in the struggle to increase life expectancy.

One index characterizing the health of the population is closely linked to the average life expectancy; this is the "life potential" index. It can be complete (for the entire period of life) or partial (calculated for a specific period of life). Assessment of the "life potential" is done as follows: if the product of the birth rate and the index for average life expectancy is greater than unity, then the complete life potential is growing; if, however, the product is less than unity, the life potential is falling (E. Fil'roze, 1978; M.S. Bednyy 1919).* The life potential for the population of Naryn Oblast, which we calculated for the first time (2.5), indicates that it is growing. This value is rather greater than for Kirghizia as a whole, where it is 1.67. The complete life potential for the population of Naryn Oblast results from the high birth rate, and the differences are small between the indexes for average life expectancy in Naryn Oblast and in the republic as a whole.

Conclusions.

1. Naryn Oblast possesses a number of specific features in terms of its population's age and social structure: the overwhelming majority of the population is made up of Kirghiz (96.1 percent), and the rural population is dominant (82.5 percent); compared with the republic,there is a smaller proportion of economically active population and of individuals working in occupations connected with machine building and construction; there is a larger proportion of children and of individuals engaged in agricultural production. These features require a differential approach to the organization of medical and sanitation services for the population in the oblast.

2. The oblast is distinguished from other zones in the republic by a high birth rate and low mechanical population growth. Accordingly, population growth is taking place more slowly than in the republic as a whole.

3. Average life expectancy for various social groups among the population differs; this is a reflection of the set of factors that affect the health of individual population contingents aggregated in any given social group. The "life potential" index for the oblast population indicates a growing life potential substantially greater than for the republic as a whole.

4. It has been established that diseases of the respiratory organs and of the circulatory organs exert the greatest effect on the index for average life expectancy (4.6 years and 3.3 years respectively).

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* M.S. Bednyy. "Mediko-demograficheskoye izucheniye narodonaseleniya" [Medical-Demographic Studies of Population], Moscow, "Statistika" 1979 pp 94-95

9642
CSO: 1840/243

UDC 576.852.21.095.5

EFFECT OF CHEMICAL MUTAGENS ON VARIABILITY OF PIGMENT FORMATION BY MYCOBACTERIUM BREVICALE

Kiev MIKROBIOLOGICHESKIY ZHURNAL in Russian Vol 44, No 5, Sep-Oct 82 (manuscript received 24 Nov 81) pp 32-36

DARASELIYA, G. Ya., Institute of Plant Biochemistry, Georgian SSR Academy of Sciences

[Abstract] Different concentrations of N-nitrosomethylurea (NMU), N-nitrosoethylurea (NEU) and N-nitrosodimethylurea (NDMU) were tested for their ability to induce differences in carotenoid pigment formation by Mycobacterium brevicale. The results showed that NMU was the most efficient mutagen in this respect, and resulted in the isolation of one mutant producing 4825 mcg/g of carotenoid pigments (about twice the level of the parental strain). The increased concentration of the carotenoids was largely due to the increase in the synthesis of neoxanthine and to the production of a new pigment identified as hydroxyechinonen. Figures 2; references 11: 1 Czech, 9 Russian, 1 Western.
[254-12172]

UDC 576.851.7.095

THEORETICAL ANALYSIS OF EFFICIENCY OF BACTERIAL OXIDATION OF METHANE IN COAL MINES

Kiev MIKROBIOLOGICHESKIY ZHURNAL in Russian Vol 44, No 5, Sep-Oct 82 (manuscript received 21 Jul 81) pp 36-40

KURDISH, I. K., KHENKINA, L. M. and MALASHENKO, Yu. R., Institute of Microbiology and Virology, Ukrainian SSR Academy of Sciences

[Abstract] Theoretical analysis is presented of the task of diminishing the methane content of coal by methane-oxidizing bacteria. The basic problem appears to be delivery of adequate oxygen for acceptable levels of oxidation. A mathematical treatment has been devised to determine the

volume of oxygen (or air) required for methane removal from coal suspension charged with the appropriate bacterial cultures, in which the large surface area of the coal particles is viewed as an adsorbing medium for the bacterial suspension, increasing thereby the bacterial concentration exposed to diffusable oxygen. Immobilization of the bacteria can be enhanced by the use of argillaceous minerals in the mixture. References 15: 2 Ukrainian, 10 Russian, 3 Western.
[254-12172]

UDC 576.8.097.29.582.288

TOXICOLOGICAL CHARACTERISTICS OF CERTAIN FUNGAL SPECIES FORMING BIOLOGICALLY ACTIVE SUBSTANCES

Kiev MIKROBIOLOGICHESKIY ZHURNAL in Russian Vol 44, No 5, Sep-Oct 82 (manuscript received 30 Jul 81) pp 55-58

KURBATSKAYA, Z. A. and ZAKORDONETS, L. A., Institute of Microbiology and Virology, Ukrainian SSR Academy of Sciences

[Abstract] Toxicologic studies were conducted on Fusarium culmorum, F. moniliforme, F. solani, F. sambucinum, and Acremonium spp., since these microorganisms serve as sources of protein and amino acids for commercial use. The microorganisms were grown in a variety of liquid cultures and on oats, and tested on mice and rabbits, as well as on bacteria, yeasts and algae for antibiotic activity. The greatest toxicity was exhibited by F. moniliforme (LD_{50} = 405 mg/kg for mice, death in 4-6 days after i.p. culture extract); this species also possessed considerable antibiotic properties. F. culmorum was much less toxic, while the remaining species were judged to be nontoxic. Figures 2; references 15: 12 Russian, 3 Western.
[254-12172]

THIRD ALL-UNION CONFERENCE ON "THEORY AND PRACTICE IN CONTROLLED CULTIVATION OF MICROORGANISMS"

Kiev MIKROBIOLOGICHESKIY ZHURNAL in Russian Vol 44, No 5, Sep-Oct 82 pp 96-99

VASKIVNYUK, V. T.

[Abstract] The Third All-Union Conference on "Theory and Practice in Controlled Cultivation of Microorganisms" was held in Kiev from September 29 to October 1, 1981. The conference consisted of 22 reports and 187 poster presentations dealing with various aspects of controlled

microbial cultivation. In addition to the topics which were covered in the working sessions (biochemistry, morphology, physiology, technology), the final discussion emphasized the need for studies on mass exchange, technological developments, and definitive mathematical models for mixed and monocultures.
[254-12172]

UDC: 615.31:547.466.64].015.2:615.214].015.4:612.822.1

INFLUENCE OF PSYCHOTROPIC SUBSTANCES ON ^{14}C GLUTAMATE UPTAKE BY COARSE SYNAPTOSOMAL RAT BRAIN FRACTION

Farmakologiya I TOKSIKOLOGIYA in Russian No 6, Nov-Dec 82
(manuscript received 31 Dec 81) pp 17-20

GANKINA, Ye. M., ABDULOV, N. A. and MAYSOV, N. I.; Laboratory of Pharmacology of Emotional Stress and Neurochemical Pharmacology, Institute of Pharmacology, USSR Academy of Medical Sciences, Moscow

[Abstract] A study was made of the influence of psychotropic substances of various classes on the process of inverse glutamate uptake by the high affinity system of the coarse synaptosomal fraction of the rat brain. This fraction was obtained by centrifugation ofaa 10% rat brain homogenate in 0.32 M saccharose at 1000 g for 10 minutes. The supernatant fluid was recentrifuged at 11000 g 20 minutes. The sediments were resuspended in 0.7 ml 0.32 M saccharose per 1 g of initial brain mass. Fifty microliters of the suspension obtained were taken and added to 1 ml incubation medium containing 100 mM NaCl, 6 mN KCl, 2 mM $CaCl_2$, 1.14 mM $MgCl_2$, 5 mM Na_2PHO_4, 10 mM glucose, 100 mM saccharose and 30 mM tris-HCl buffer, pH 7.4, a labeled mediator and pharmacologic substance. Incubation was performed at 37°C for 20 minutes with continuous agitation, then uptake was interrupted by cooling to 0-5°C. It was found that there are two systems of glutamate transport: a highly specific active transport with high affinity plus passive transport with low affinity. The psychotropic substances of various classes (neuroleptics, antidepressants, tranquilizers, psychostimulators, narcotic analgesics) had no selective influence on glutamate uptake with high affinity; inhibition appeared only at high concentrations of the preparations. Diphenyl hydantoin increases the uptake of glutamate by synaptosomes, which may be of significance in its anticonvulsive effect. Figure 1; references 8: 3 Russian, 5 Western. [179-6508]

UDC 612.89:612.819

ELECTRICAL ACTIVITY OF THE SYMPATHETIC NERVOUS SYSTEM RECORDED ON SKIN SURFACE

Kiev DOKLADY AKADEMII NAUK UKRAINSKOY SSR. Seriya B in Russian No 12 Dec 82 pp 69-71

[Article by Academician V. I. Skok, UkSSR Academy of Sciences, L. V. Mel'nichenko, I. N. Remizov, S. L. Purnyn' and V. V. Gerzanich, Institute of Physiology, UkSSR AS]

[Text] Recording the electrical activity of the sympathetic nervous system is of great interest since it is with the aid of sympathetic fibers that the functions of all internal organs and the cardiovascular system are regulated. Up until now, however, this recording has been possible only with application of an invasive method--introduction of a microelectrode into a nerve bundle [1]. We are presenting a method which allows recording of natural electrical activity of sympathetic nerve fibers in humans with the aid of electrodes placed on the surface of the skin.

It is well known that the action potential of a human nerve, evoked by a single electrical excitation, can be detected by placing electrodes on the skin surface over the nerve. Since the actual signal in this case is below the threshold noise level of the amplifier, we apply storage, synchronous with the impulse, and averaging [2-4].

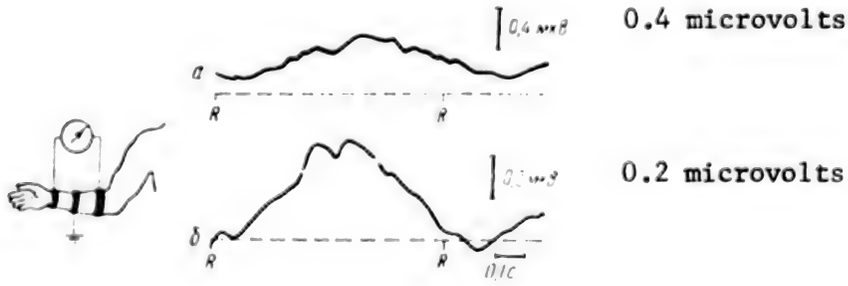
Since sympathetic stimulation of skeletal muscle vasoconstrictors is modulated by cardiac rhythm [5], this allows us to use the R wave of the EKG as a signal for synchronizing storage. In preliminary acute experiments on cats and rabbits, optimal characteristics of the amplifier were obtained for picking up the signal (the natural excitation) stored in the cardiac rhythm with direct recording from branches of the sciatic nerve containing sympathetic fibers [6]. Then the electrodes were moved to the skin surface of the animal's paw over the sciatic nerve and a signal was detected that was evoked by the excitation of the end sympathetic bundle stored in the excitation rhythm, as well as a signal elicited naturally and stored in the cardiac rhythm. Then this method was applied to record natural sympathetic activity of nerves in the forearm.

The recording was done using ring-shaped metal electrodes encircling the arm, one (active) was placed on the proximal part of the forearm over muscles, and another was placed on the distal part of the forearm over tendons. Signals through the low-frequency amplifier were stored. With the aim of eliminating

mechanical and electrical artifacts caused by flow of the blood through vessels under the electrodes, blood flow to the arm was stopped for the recording period (up to 2 minutes) by occluding the humeral artery with a cuff inflated to approximately 26 664 Pa. As a result of this recording from 4 subjects in 5 experiments, each of which had an average of 270 stored recordings, an average curve was obtained, which is shown in igure a. It is clear that in the interval between the 2 R waves of the EKG, there is a slow fluctuation which corresponds to the electronegativity of the active electrode. This fluctuation is intensified sharply when the Valsalva maneuver is executed during the recording (see figure b). As has been shown previously [5], this intensifies sympathetic activity synchronously with the pulse. It should be noted that the peak of this negative deflection coincides with the maximum excitation frequency recorded by the microelectrode from single sympathetic nerve fibers in the forearm at the level at which the active electrode is placed.

On the other hand, it is known that the natural activity of sympathetic fibers on skin vasoconstrictors, vasodilators and vasomotor sympathetic fibers at room temperature is not synchronous with cardiac rhythm and consequently should not be recorded under the given conditions [7].

Everything presented above permits us to propose that the difference in amplitude of electrical potentials which is recorded from a human's skin surface with storage in the cardiac rhythm reflects the activity of sympathetic fibers innervating skeletal muscle vasoconstrictors.



0.4 microvolts

0.2 microvolts

Electrogram, recorded from skin surface of human subject and stored as synchronous with cardiac rhythm; a) averaged electrogram, obtained in 5 tests on 4 different subjects (approximately 270 stored in each test); b) electrogram obtained in one test by removing the background electrogram from the electrogram recorded during execution of the Valsalva maneuver (125 stored for the background and Valsalva maneuver electrograms). Placement of recording electrodes is shown on the left.

Summary: The method is created for recording the natural electrical activity of human and animal sympathetic nerve fibers by skin-surface-electrodes. The activity was recorded, stored and averaged as synchronous with cardiac rhythm. The R wave of ECG was used to synchronize the averaging system. The record obtained with this technique from the human arm (a transient stop of blood flow to avoid mechanical artifacts) is a sinusoid-like curve with a negative peak between the R waves of ECG. The amplitude of the negativity is strongly potentiated by the Valsalva maneuver. It is suggested that the record obtained is the averaged sum of the action potentials that spread in sympathetic fibers innervating the skeletal muscle vasoconstrictors.

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9967
CSO: 1840/295

UDC: 612.825:612.014.42

CHANGES IN BACKGROUND AND EVOKED CEREBRAL CORTICOELECTRICAL ACTIVITY OF RABBITS UNDER THE INFLUENCE OF NEUROPEPTIDE MEMORY MODULATORS

Kiev NEYROFIZIOLOGIYA in Russian Vol 14, No 6, Nov-Dec 82
(manuscript received 10 Sep 81) pp 578-584

MEDVEDEV, V. I., BAKHAREV, V. D., AVDYUSHENKO, S. A., NEZAVIBAT'KO, V. N., PONOMAREVA-STEPNAYA, M. A. and ALFEYEVA, L. Yu., Military-Medical Academy imeni S. M. Kirov, Leningrad

[Abstract] The authors studied the changes in summary evoked potentials in rabbits under the influence of oligopeptides, which significantly accelerate the process of learning and acquisition of skills, inhibiting the loss of acquired reactions and causing a clear antiamnesiac effect. The work was performed on 64 rabbits of both sexes held in a brace of a special design. The electrodes were inserted into the skull subdurally above the visual cortex. Electrocortigrams were recorded during administration of arginine-vasopressin, a native ACTH fragment and 4 analogs, including Z=PLG. The substances studied had a clear neurotropic effect, with displacement of the encephalogram spectrum into the higher frequency area. The neuropeptides seemed to facilitate synaptic transmission. Some neuropeptides, like classical hormones, seem to act through intermediaries such as the cyclic nucleotides to stimulate the synthesis of connector proteins which, in turn, increase conductivity and excitability of the cell membranes. Figures 4; references 16: 9 Russian, 7 Western.
[149-6508]

UDC 612.014.4

INDICATORS OF ENDOCRINE AND CELLULAR IMMUNITY STATUS UNDER ALPINE CONDITIONS

Yerevan BIOLOGICHESKIY ZHURNAL ARMENII in Russian Vol 35, No 9, Sep 82 (manuscript received 14 Jul 82) pp 695-698

KAZARYAN, G. A., STEPANYAN, T. G., SARUKHANYAN, A. G., ZURABYAN, A. S., GAMBAROV, S. S. and AMBARTSUMYAN, A. S., Yerevan Physical Institute GKIAE [expansion unknown]; VNTsKh [expansion unknown] Branch, USSR Academy of Medical Sciences

[Abstract] Immunological, endocrine, and hematological indicators were evaluated in 31 25-60 year old individuals after seven to ten days at altitudes of 2000 or 3250 m above sealevel. Stays at high altitudes evoked an increase in the hematocrit and hemoglobin concentration, while leucocyte counts were normal at 2000 m but depressed at 3250 m. T and B lymphocytes were unaffected at 2000 m, but at 3250 m were depressed to, respectively, 40 and 10% of normal levels. Evaluation of endocrine parameters showed that at 3250 m both T_3 and T_4 were depressed and TSH increased. The data were interpreted to indicate that under Alpine conditions thyroid hypofunction prevails without overt manifestations, and that immune mechanisms are depressed. References 18: 16 Russian, 2 Western.
[249-12172]

UDC 614.3/.4-078:578.083.2].003.1

COST AND NET COST OF VIROLOGIC ANALYSES CARRIED OUT IN SANITATION AND EPIDEMIOLOGY STATIONS

Moscow LABORATORNOYE DELO in Russian No 8, Aug 82
(manuscript received 16 Oct 80) pp 34-37

[Article by Yu. S. Derkach, A. M. Osherovich, A. M. Myasnenko, and V. D. Neustroyev, Institute of Medical Parasitology and Tropical Medicine imeni Ye. I. Martsinovskiy, USSR Ministry of Health; Institute of Virology imeni D. I. Ivanovskiy, USSR Academy of Medical Sciences; Moscow Sanitation and Epidemiology Station]

[Text] At the current stage of incombatting virus-induced pathologic processes, the importance of virological research has been increasing. A number of clinical, epidemiological and prophylactic questions can be solved only through isolation and identification of viral agents, through control of the immunologic status of the population as well as control of viruses circulating among people, animals and vectors as well as their presence in the environment (air, water, food, etc.).

Organizers of laboratory services and workers in virology laboratories must analyze in detail the economical aspects of the activity, with due attention to specific and concrete tasks [1-3]. Questions of a general nature as far as the economics of public health is concerned [4-6] should be broken down into component parts, including those of the virological laboratories of the sanepid [sanitary and epidemiological] stations.

Economic questions in operations of virological laboratories cover the economy of labor, money matters, services and materials and they are based on the following important indices: net cost of virological analyses, coefficient of the number of analyses and laboratory units per ruble (R) of expenditure, net cost of a laboratory unit (i.e., labor measures) in virological analyses etc. In summary, all of this represents component parts of a general method of calculating economic gains from lowering morbidity due to viral infections [7-13].

It is well known that the net cost is a monetary expression of individual or average losses of crude or substantiated labor for production of a given

branch. It shows the magnitude of production outlays. Karl Marx stressed that the costs of salaries and production resources should be included in the overall production cost.

The consumption of base funds (inventory stock) representing consumable stock and labor force cannot be equally implemented in performance of virological analyses, and evidently it is impossible to express its measure in any other units than monetary. Obviously, when calculating net costs of the analyses, it is necessary to keep in mind that in the performance of virological analyses, the consumer costs are either totally expended or at least partially transferred. This is a general economic rule. In practice, however, the managers of virologic laboratories have to calculate annual expenditures for performance of analyses. It appears desirable to compile such an account of expenditures item by item, because it would make it possible to analyze work in virological laboratories and to create reserves of manpower resources.

A classification chart of expenditures should include the costs of at least the following group of outlays: nonspecific expenditures connected with basic funds and salaries, and specific ones connected with typical expenditures incurred during performance of virologic analyses (consumption of tissue culture, laboratory animals, nutritive media and diagnostic preparations for identification of viruses, etc.). Let us analyze a calculation of expenditures with respect to the following items of outlay:

1. Salaries of the workers in virological laboratory.

2. Cost of starting material and objects of a single use common to all types of virological analyses (growth nutrient media, alcohol, cotton, gauze, soap, disinfecting agents, etc.).

3. Cost of specific materials and objects of a single use, applicable to specific, concrete virological analyses (special tissue cultures, chick embryos, laboratory animals, diagnostic preparations, etc.).

4. Cost of equipment, laboratory glassware,aand small upkeep goods with up to one year life expectancy.

5. Expenditures connected with shared services (heating, water, gas, sanitation, electricity).

6. Cost of laboratory equipment and furniture with a long (more than one year) service expectancy.

It is also necessary to add to this out-of-the-laboratory expenses, which are yet another cost component of virological analyses. This includes outlays for administration of sanepid stations, where the virologic divisions are located [9]. The virology laboratory component is determined as a sum total of several portions of the overall cost, including the rent, communication, transport and staff. This calculation is based on direct proportional allocation.

In the proposed classification the costs of the items 1,2,3,4,5 are completely spent during a year while performing virological analyses and consequently their cost is totally transferred to the cost of such analyses. The cost of item #6, which projects stock outlay for several years, is gradually transferred to the cost of analyses in several allocations. Therefore, the manager of a virological laboratory must be aware of all depreciation coefficients for each of these stock items so as to be able to calculate the specific cost from the single outlay during the procurement of new equipment. Obviously, this type of cost is determined as a constant component of the cost of operating virological analyses; this component can be determined as accurately as it is possible to determine the service period for such items which are designed to run for many years. Based on current regulations, on the medical-technological demand and on the analysis of the use of virological equipment in sanepid stations, it is customary to take the performance period of soft inventory as being 1-2 years; thermostats, refrigerators, drying cabinets, microscopes, laboratory furniture and similar items should be serviceable for 10 years.

The total of all expense items gives the general magnitude of cost of all analyses - a concrete expression of the economical side of the activity in a virology laboratory.

It is of interest to analyze a set of outlay calculations connected with operating concrete determinations. A real aid here is a set of calculated data of time requirements and consumption of media and other stock items performed in sanitation and epidemiology stations [8, 10].

Thus, the net cost of the studies consists of three main components: 1) outlays for consumable ingredients of a single application during a year; 2) salaries of laboratory personnel; 3) depreciation of equipment and payment for various services. The first component is constant, while the second and third, depending on the productivity of the labor force, are alternatively included in the net cost of a single analysis. It became clear that lowering the net cost of virologic analyses can be achieved by enlargement of the laboratory, since with an increase in staff even by one brigade over the existing strength, it is possible to perform specialized serial analyses leading to increased productivity by 7-10% in a two brigade division and 12-30% in three brigade units. This also leads to an increased coefficient of equipment utilization and lower depreciation outlays of various types.

Table 1 shows the costs of some virologic analyses based on the 1980 costs of preparations. The cost of virologic analyses of adenoviruses was 91 kopeks (k) for negative results and 10 R 99 k for positive results. In serial isolations of adenovirus strains, the cost of each following analysis was 3 R and 90 k. The cost of serologic analysis of paired serum for adenovirus was 1 R and 13 k. The cost of environmental analysis (sewage, soil, wash-outs, etc.) was 6 R and 32 k for negative results and 13 R and 13 k for positive findings. The net cost of basic analyses is reported in Table 2.

Conclusions.

1. High net cost of virologic analyses relates principally to the cost of diagnostic preparations produced by respective Scientific Research Institutes. It is also related to the organizational system of the labor force in the laboratories.

2. The following are practical ways to lower net costs of virologic analyses; concentration of production of individual preparations and achievement of improved technology for this step; introduction of the brigade method for the organization of the work force at the laboratories of the sanepid stations because it leads to considerable improvement of work productivity; increase of work productivity by introduction of improved modern equipment; it is desirable to have at least 3 brigades in virology laboratories, because a lower personnel number results in a 30-37% drop of work productivity; it is mandatory to cut nonproductive time loss and to increase the number of serial analyses because this lowers labor and depreciation outlays.

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Cost of a Single Virological Analysis for Influenza Virus

Table 1

1 Расходуемый материал	2 Вирусологические исследования				5 Изучение выделенного штамма		6 Индикация вирусов методом иммунофлюоресценции[1]	
	3 С отрицательным результатом		4 С положительным результатом					
	7 количество	8 стоимость	9 количество	10 стоимость	11 количество	12 стоимость	13 количество	14 стоимость
15 Тампон	16 2 шт.	17 2 коп.	18 2 шт.	19 2 коп.	20 —	—	21 —	22 2 шт.
Раствор Хенкса	1 мл	1 коп.	3 мл	1 коп.	—	—	—	—
Куриные эмбрионы	12 шт.	3 руб. 60 коп.	30 шт.	9 руб.	20 шт.	6 руб.	—	—
Спирт	100 мл	10 коп.	210 мл	21 коп.	150 мл	22 коп.	3 мл	0 коп.
Куриные эритроциты	0.25 мл	8 коп.	1.2 мл	18 коп.	2 мл	80 коп.	—	—
Иммунные сыворотки каждого серовара	—	—	0.25 мл	—	0.5 мл	21 коп.	0.25 мл	1 руб.
Крысы	—	—	—	—	2 шт.	2 руб. 60 коп.	—	—
Мыши	—	—	—	—	2 шт.	31 коп.	—	—
Антибиотики	—	2 коп.	—	2 коп.	—	2 коп.	—	—
Лейкопластырь	10 см	2 коп.	10 см	2 коп.	10 см	2 коп.	—	—
Вата	0.2 г	1 коп.	0.4 г	2 коп.	0.4 г	2 коп.	—	—
24 Всего	25 3 руб. 91 коп.		26 10 руб. 9 коп.		27 10 руб. 23 коп.		28 1 руб. 2 коп.	

[1] Включена стоимость исследования одного материала с тремя люминесцентными сыворотками — гриппозной, аденовирусной и парагриппозной

[2] В расчет принята средняя стоимость одного куриного эмбриона, равная 30 коп.

29

Key:

1. Material consumed.
2. Virological analysis.
3. With negative result.
4. With positive result.
5. Analysis of isolated strain.
6. Virus induction by immunofluorescence method[1].
7. Quantity.
8. Cost.
9. Quantity.
10. Cost.
11. Quantity.
12. Cost.
13. Quantity.
14. Cost.
15. Tampon.
    Hank's solution.
    Chick embryos[2].
    Alcohol.
    Chick erythrocytes.
    Immune sera of each serovar.
    Rats.
    Mice.
    Antibiotics.
    Adhesive tape.
    Cotton.
16. 2 units.
    3 ml.
    12 units.
    100 ml.
    0.25 ml.
    -
    -
    -
    -
    10 cm.
    0.2 g.
17. 2 kopecks (k).
    1 k.
    3 Rubles (R) 60 k.
    16 k.
    8 k.
    -
    -
    -
    -
    2 k.
    2 k.
    1 k.

[Key continued on following page.]

18.	2 units.	19.	2 k.	20.	-
	3 ml.		1 k.		-
	30 units.		9 R.		20 units.
	210 ml.		31 k.		150 ml.
	1.2 ml.		18 k.		2 ml.
	0.5 ml.		-		0.5 ml.
	-		-		2 units.
	-		-		2 units.
	-		2 k.		-
	10 cm.		2 k.		10 cm.
	0.4 g.		2 k.		0.4 g.

21.	-	22.	2 units.	23.	2 k.
	-		-		-
	6 R.		-		-
	22 k.		3 ml.		0.4 k.
	80 k.		-		-
	21 k.		0.75 ml		3 R.
	2 R 60 k.		-		-
	54 k.		-		-
	2 k.		-		-
	2 k.		-		-
	2 k.		-		-

24. Total.
25. 3 R 91 k.
26. 10 R 9 k.
27. 10 R 23 k.
28. 3 R 2 k.
29. [1]Included are the costs of one test material with three luminescent sera: influenza, adenovirus and parainfluenza.
[2]The average cost of one chick embryo (30 k) was used in calculation.

Table 2

Net Cost of Principal Virological and Serological Analyses Performed in Virological Laboratories of Sanepid Stations

1 Инфекция	2 Вид исследований	3 Стоимост
4 Грипп	Вирусологическое исследование с отрицательным результатом:	
	единичное	17 руб. 01 коп.
	каждое последующее	6 руб. 98 коп.
	Вирусологическое исследование с отрицательным результатом в период вспышки гриппа А:	
	единичное	11 руб. 22 коп.
	каждое последующее	4 руб. 71 коп.
	Вирусологическое исследование с положительным результатом:	
7	единичное	8 23 руб. 72 коп.
	каждое последующее	13 руб. 45 коп.
	Исследование методом иммунофлюоресценции с тремя сыворотками:	
	единичное	7 руб. 78 коп.
	каждое последующее	5 руб. 98 коп.
5 Аденовирусная инфекция	Вирусологическое исследование с отрицательным результатом:	
	единичное	9 руб. 39 коп.
	каждое последующее	3 руб. 99 коп.
	Вирусологическое исследование с положительным результатом:	
9	единичное	10 29 руб. 89 коп.
	каждое последующее	8 руб. 02 коп.
	Исследование парных сывороток в РСК (1 пара):	
	единичное	30 руб. 65 коп.
	каждое последующее	17 руб. 56 коп.
6 Энтеровирусные инфекции	Вирусологическое исследование с отрицательным результатом:	
	единичное	9 руб. 58 коп.
	каждое последующее	4 руб. 18 коп.
11	Вирусологическое исследование с положительным результатом:	12
	единичное	41 руб. 61 коп.
	каждое последующее	25 руб. 12 коп.
	Вирусологическое исследование на мышах-сосунках:	
	единичное	36 руб. 72 коп.
	каждое последующее	19 руб. 74 коп.
	Исследование парных сывороток в РСК 5 антигенами вирусов Коксаки А:	
	единичное	39 руб. 46 коп.
	каждое последующее	8 руб. 61 коп.

Key:

1. Infection.
2. Type of analysis.
3. Cost.
4. Influenza
5. Adenoviral infection.
6. Enteroviral infections.

[Key continued on following page.]

7.	8.
Virological analysis with negative results	
single	17 R 01 k
each additional	6 R 98 k
Virological analysis with negative result during outbreak of influenza A	
single	11 R 22 k
each additional	4 R 51 k
Virological analysis with positive result	
single	23 R 72 k
each additional	13 R 45 k
Immunofluorescence analysis with three sera	
single	7 R 78 k
each additional	5 R 98 k

9.	10.
Virological analysis with negative result	
single	9 R 39 k
each additional	3 R 99 k
Virological analysis with positive result	
single	29 R 89 k
each additional	8 R 02 k
Analysis of paired sera in RSK [unknown abbr.] (one pair)	
single	30 R 65 k
each additional	17 R 56 k

11.	12.
Virological analysis with negative result	
single	9 R 58 k
each additional	4 R 18 k
Virological analysis with positive result	
single	41 R 61 k
each additional	25 R 12 k
Virological analysis done on suckling mice	
single	36 R 72 k
each additional	19 R 74 k
Paired sera analysis in RSK with 5 antigens of Coxsackie A viruses	
single	39 R 46 k
each additional	8 R 61 k

7813
CSO: 1840/231

GEORGIAN CENTER LEADS NATION IN TREATMENT OF SEPSIS

Tbilisi ZARYA VOSTOKA in Russian 30 Jan 83 p 4

[Article by Alla Kokodze: "A Complex Attack"]

> [Text] The telegram from the city of Alekoandrov, Vladimir Oblast, that arrived at the Republican Antisepsis Center in Tbilisi was alarming. It demanded first aid for a critically-ill patient that could only be rendered by the associates of this center, which is for the present the only one in the nation.
>
> Patients often come here for treatment from various corners of the nation, while the center specialists regularly leave for consultations outside the republic.

Recently in Tbilisi, at the headquarters of this center and the Department of Infectious Diseases of the Advanced Training of Physicians Institute, for the first time in the nation a cycle of lectures on sepsis control was held for the professorial-teaching staff. During the month, the students went through not only a theoretical course but also practical studies with patients. Working with them were experienced specialists--the center supervisor Professor Vakhtang Bochorishvili, his deputy Professor Guram Nizharadze, docents Ketevan Gomelauri, Tina Gegiya and others. There studies were conducted on the basis of the decision of a plenum of the Scientific Council of the USSR Academy of Medical Sciences on the need for disseminating in other republics the experience of the nation's first antisepsis center, created in Tbilisi. The achievements of the center in the struggle with this critical ailment were also described at a conference on surgical sepsis recently held in Moscow. In speaking of the complex attack on sepsis by infectionists, surgeons and pediatricians, Professor V. Bochorishvili stressed that the specialists also conduct important prophylactic work for detecting difficultly-diagnosed forms of sepsis and organize the training of qualified cadres.

"New methods for treating patients have recently been introduced," says Vakhtang Gavrilovich. "Good results were also obtained from the use of

immune therapy of patients with staphylococcal sepsis. The immune preparation used here was developed at the Vaccines and Sera Scientific Research Institute of the republic's Ministry of Health, with which we have established the closest contacts. Thus, we use in the clinic an intravenous bacteriophage developed at that institute. A method for diagnosing staphylococcal sepsis also received a positive evaluation. In our center, Candidate of Medical Sciences Ninov Makhviladze has developed a method of heparinotherapy, preventing intravascular blood clotting.

"All these innovations assist physicians in successfully combatting a critical ailment. Thus, patient L. entered our center, in a hopeless condition, it would seem. The physicians found severe sepsis, with wounding of the lungs and all soft tissues. For more than a month the specialists struggled for the life of the young man, and their efforts were crowned with success. Now our patient is preparing for release."

Any day now another patient will abandon the walls of the hospital and return to her family. This 34-year-old woman was brought from Zestafoni with a very poor diagnosis. Against the background of an old cardiac defect, the developed several illnesses, each of which by itself was already mortal. Here also the physicians emerged victorious after a sharp fight with the ailment.

The list of such victories can be extended. Affiliates of the center, which have been opened in Sukhumi, Batumi and Kutaisi, also work successfully.

The leading specialists of the center often leave for rayons and villages of the republic, rendering the local physicians practical and theoretical assistance. They also conduct inter-rayon seminars on the diagnosis and therapy of sepsis and carry on an important methodological and teaching work.

9942
CSO: 1840/206

DISEASES THAT COULD BE ELIMINATED

Vilnius SOVETSKAYA LITVA in Russian 9 Feb 83 p 2

[Article by G. Lapinskayte, chief physician Republic Dermatological and Venereal Dispensary]

[Text] He is an agronomist, she is a teacher. They make up a young family whose story I would like to tell. They lived happily for 3 years. They seemed to others to be happy, they thought so themselves. They were expecting a baby. The baby clothes were purchased. But ... they were not destined to become a mother and a father. It was determined that the reason for this was a disease that the young teacher had never suspected--syphilis. The normal blood analyses could not detect it in time. Moreover, right from the start the enemy developed in secret, with no obvious symptoms. However, it did exist, and the diagnosis was confirmed by special tests.

And the reason for this unhappiness was a casual liaison by the husband. Once, when he was drunk, he had been with a women whose name he did not even know. This thoughtlessness and inability to control his own actions led to the calamity. Thus was made an unjustifiable error for which the person nearest and dearest to the man paid with mental anguish.

This story once again underlines that weakness of character, manifest under the effects of alcohol, leads to misfortune. This is why it is necessary to be reminded again that each person should learn to control himself, not to lose his sense of proportion when using liquor, and always remain in command of his actions. Alcohol "dampens" the ability of self-control. And it sometimes happens that a sober man would not risk a casual liaison, but when he drinks he could not care less...

This story, and other similar, by no means rare stories, recall once again the danger of infection with venereal diseases. Despite the widely ramified network of medical facilities and the higher level of general sanitary standards, it is very difficult to deal with these diseases without the help of the public... Everyone must be aware of their existence and of the need to be careful of them.

Veneral diseases, of which the most dangerous are syphilis and gonorrhea, are infectious; they are spread most often by the sexual route. Now, when

living conditions have been considerably improved, adults are almost never infected with venereal diseases in the domestic situation. Disease can be passed to children in close domestic contact.

Syphilis is the most serious of these diseases. It also affects the offspring: a women with syphilis can infect the fetus even before birth. The symptoms of this enemy are widely known. However, it should be remembered that sometimes its initial symptoms are slight and can remain unnoticed. A small, painless chancre appearing at the site of the infection disappears, leaving no scar. The rash observed on the body in the second stage of the disease, which does not bother the patient, also frequently disappears. At this time patients, who still do not suspect the enemy, are extraordinarily dangerous for those around them, especially children.

If the disease remains untreated it moves to an occult form and can last for many years. In its third stage syphilis appears unexpectedly, when the patient's body is weakened as the result of other illnesses or accidents. The flareup in the disease can bring catastrophe: the syphilis agent can destroy any organ or tissue, turning the patient into an invalid. Thus, the patient may go blind or deaf and sudden death may occur as a result of destruction of major blood vessels or the aorta, and there may be paralysis and dementia. If syphilis remains untreated in the first and second stages it is extraordinarily difficult to stop the disease.

In our country much attention is given to the struggle against venereal diseases. Treatment is mandatory. Patients are guaranteed medical secrecy. In turn, a person who has the disease should inform all persons with whom he has had close contact. This is done in order to prevent the further spread of the disease. Regular prophylactic checks of citizens are made in order to detect the disease. These checks should not be avoided: they are done in the interests of your health and the health of your nearest and dearest.

9642
CSO: 1840/246

IMPORTANCE OF PUBLIC HEALTH

Riga KOMMUNIST SOVETSKOY LATVII in Russian No 11, Nov 82

[Article by V. Kanep, Minister of Health of the Latvian SSR: "Protecting Public Health--An Important Social Goal"]

[Text] The program requirement of the Communist Party of the Soviet Union, "In the name of man, for the good of man," is directly reflected in the social and economic measures being implemented in the area of public health. The preservation of the health of workers has been recognized as one of the most important social goals of our government and has become a truly national affair. The USSR Fundamental Law elevates the concern for the health of the Soviet people and improvements in living and work conditions to the rank of a constitutional norm for the operation of the state. The goals of Soviet public health at the current level have been given concrete expression in a recently-passed resolution of the CPSU Central Committee and USSR Council of Ministers, "On Supplementary Measures to Improve Health Protection in the Population." Citizens of the USSR have at their disposal free, high-quality medical aid from state public health facilities. We have become used to this as a given in our lives.

Our republic has also made a significant contribution to the development of a system of public health in the USSR. The achievements and successes of Soviet Latviya in the area of public health are particularly obvious if compared to the situation that existed in public health in bourgeois Latviya.

Here is what the facts and figures show. In 1939 there were 12 doctors and 62 hospital beds per 10,000 residents in Latvia. This was one of the worst indicators in Europe at that time. Medical services to rural residents were extremely poorly organized. Facilities that are so common today, such as the medical-sanitation section of industrial enterprises, the medical clinics of plants, factories and sovkhozes, plant clinics, children's dairy kitchens, houses of health education, epidemiology stations, dispensaries and women's consultation facilities, were not available.

Private medical aid was very expensive. Documents remain that mention instances in which people had to use their estates to pay off private bills to doctors and hospitals.

This type of health system was naturally powerless in the struggle against a whole series of threatening deseases, and in particular against tuberculosis, which affected masses of the population.

With the institution of Soviet power in Latvia a socialist system of public health was instituted, based on the principles of free, high-quality public health services. The state took on the full responsibility for protecting the health of the people.

In recent years a high level of public health has been achieved in the republic. There are now 44.7 doctors, 116.4 intermediate health workers and 136.8 hospital beds per 10,000 residents. The proportion of doctors here is 2.5 times greater than in the USA and 2.8 times greater than in Sweden.

The general mortality rate has dropped. The average life expectancy has increased by 12 years from 58 to 70. The Latvian SSR has entered the demographic zone of longevity.

In our republic we have been victorious over serious illnesses such as poliomyelitis, diptheria, typhus, malaria and tularemia. There are no infections that require quarantining. Measles, whooping cough have become rare and there has been a sharp drop in the number of intestinal diseases. In Soviet Latvia tuberculosis has decreased tenfold and there are fewer cases here than in the country as a whole. A great deal is being done to protect the health of the mother and child; internal resources are constantly being sought. As a result we have achieved the lowest mother and child mortality in the country.

All of this is the result of extensive transformations occurring in the republic during the years of socialist building. It is a natural result of the socio-economic policies of our party in the area of public health and of the fraternal aid of all the peoples of the USSR.

It should be remembered that Latvia joined the USSR considerably later than the other republics. The treacherous attack of Hitler Germany on the Soviet Union halted socialist development and brought great losses to the economy, including to public health in Soviet Latvia.

However, by the early 1950's public health in Soviet Latvia was able to reach pre-war indicators and then to surpass them greatly. The party and state took all the necessary measures to quickly rebuild all health facilities that were destroyed and to supply them with medications, materials and professional cadres. Well-known doctors came to Latvia--Professor A. Lepukaln from Moscow, academician A. Shmidt and professors E. Burtniyek, V. Kal'berg and M. Belen'kiy from Leningrad, academician P. Gerke from Minsk and professor Ya. Bune from Kursk. Their contribution to Latvian medicine is considerable.

Today the public health network in Soviet Latvia has a powerful material and technical base at its disposal. During the post-war period over 200 hospitals, clinics, dispensaries, epidemiology stations and other facilities have been built in the republic. During the years of the last two five-year plans alone a number of health facilities meeting modern needs have been built. These

include the new maternity house in Riga, a unique hospital complex with 1,200 beds--the Seventh Riga City Hospital, Gayl'ezers, where 20,000 persons are treated annually, a cardiology facility built for the Republic Clinical Hospital imeni P. Stradyn and planned for treating 5,000 patients annually. In recent years nine new clinics have appeared in Riga. The largest hospital in the country, the Valmiyerskaya Central Rayon Hospital, an all-union school for leading work practices, has achieved national renown. Modern hospitals have been built in Tsesis, Saldus and Yekabpils; new clinics-in Tukums, Yelgava, Daugavpils, Preyli, Rezekne, and Stuchke. A maternity house has been built in Ventspils and a number of medical facilities have been built in other cities and rayons in the republic. The building of new medical facilities continues today.

City and rayon party committees and local soviets are expressing great concern over the development of medical facilities. We should particularly note the city of Rezekne and Kraslavskiy, Madonskiy, Valkskiy, Valmiyerskiy and Liyepayskiy rayons. Here, for example, their own resources were utilized to renovate old and build new clinic and hospital wings.

At the present time the republic's population receives highly-trained medical aid in all specialties. At the same time the equalization of medical services to urban and rural populations is becoming more and more evident. Already today rural residents receive medical aid in 19 specialties in large central rayon and zonal hospitals and in 22 specialties in clinics. In fulfilling the decisions of the May 1982 Plenum of the CPSU Central Committee, the Latvian Ministry of Health is taking all possible measures to accelerate this process.

The health of the people is a public treasure not only in the broad social but also in the economic sense of the word. For this reason considerable attention is given to improving labor conditions for workers in industrial enterprises, for builders and for fishermen. In the republic job-related illness has decreased by 27 percent in 1981 alone. The level of temporary inability to work is also decreasing in the worker population. In 1981 as compared to 1980 it decreased another 10 percent.

An important direction for our work is the modern prevention, diagnosis and effective treatment of illnesses that are most prevalent in Latvia (as in the entire world)--cardiovascular, cancer, lung and some other diseases. Here we have achieved considerable success. Our surgeons are capable of performing the most complex operations on the heart, vessels, lungs, kidney transplants, etc. New diagnostic and treatment methods are being widely utilized in oncology, gastroenterology, hematology and other specialties. The implementation of a complex of prophylactic measures and the development of specialized medical aid in the republic resulted in a decrease in the mortality rate due to cardiovascular diseases and enabled us to increase the life expectancy of oncological patients and to decrease the percentage of disability among individuals suffering from chronic cardiovascular and lung diseases.

Numerous facts attest to the extent of preventive work done by us. Mass screening for early detection of diseases such as tuberculosis, cardiovascular, oncological and others encompasses about 2 million persons annually. Health

clinics regularly see 640 out of every 1,000 residents in the republic. In the future it is planned to regularly oversee the entire population in clinics.

Our efforts have been highly rated by the USSR Ministry of Health. The republic has become the all-union school of progressive experiments in various directions. For example, the methodology of automated detection of cardiovascular diseases developed and introduced by Latvian cardiologists has been adopted by a number of medical facilities in Leningrad, Baku, Kursk and Gelendzhik. The workers of the Valmiyerskaya Central Rayon Hospital and of the Republic Clinical Hospital imeni P. Stradyn share their findings in the areas of tuberculosis, anatomical pathology and hepatology with colleagues in other republics. They conduct all-union seminars for the chief doctors of city, oblast and central rayon hospitals and for other specialists.

Success in health protection for the population is closely related to the development of medical science. The medical science of Soviet Latvia is one of the most important components of all scientific and technical potential in the republic. At the same time the level of medical science in the Latvian SSR is the natural result of the fruitful cooperation of Latvian scientists with colleagues in fraternal republics.

During the postwar years it was necessary to almost rebuild Latvian medical science from scratch--to create a network of scientific-research institutions, to select the basic directions for research and to concentrate the efforts of scientists on them, to prepare cadres, and to improve the effectiveness of research.

In 1946 when it became necessary to develop new methods of treating the disabled from the Great Fatherland War, the first specialized scientific-research facility was established in Latvia--the Institute of Trauma and Orthopedics. Later the Riga Medical Institute, the Scientific-Research Institute of Experimental and Clinical Medicine, called upon to deal with theoretical and applied problems, the Central Scientific-Research Laboratory, the Problem Laboratory for Clinical Biochemical Infections Diseases and the Scientific-Research Institute of Cardiology were created. Considerable aid was given by organizations, collectives and individual scientists of fraternal republics in this endeavor.

The republic developed its own scientific medical schools. A large detachment of scientists-medical specialists works here. Over 70 percent of these persons are candidates or doctors of science. Among them are well-known scientists, organizers of science and specialists such as academicians of the Latvian SSR Academy of Sciences R. Kukayne and A. Blyuger, corresponding member of the USSR AMN [Academy of Medical Sciences] V. Kalnberz, corresponding member of the Latvian SSR Academy of Sciences A. Krauklis, and professors G. Andreyev, N. Andreyev, Yu. Anshelenich, A. Bergman, R. Kikut, Ye. Linar, M. Melzobs, V. Purmalis, I. Silin'sh, V. Utkin, G. Eninya and others.

Latvian medical scientists are successfully working on problems of medical science. These include new directions in the areas of diagnosis, treatment and prevention of cardiovascular, oncological and viral diseases, pulmonary and digestive

disorders, hematological and stomatological conditions, organ and tissue transplants as well as important problems in public hygiene and the organization of public health, the scientific organization of labor, medical cybernetics and the search for new medicinal preparations.

Between 1976 and 1980 330 new methods of diagnosis, treatment and prevention were introduced into practice in the republic.

Successes confirmed by numerous inventors' patents are satisfying. Today there are over 400 of these belonging to the republic's scientists; 101 of these are patented abroad.

Concern about a rapid introduction of the results of experiments and efficiency proposals into the practice of health care required the creation of a special experimental production facility. It was set up at the Medtekhnika Plant, where in the course of the 10th Five-Year Plan 280 items for medical technology were assimilated from the inventions of scientists and doctors in the republic.

A new form of integrating medical science and practice in public health was the development of the scientific-educational-applied science association. This type of association represents a single structural complex including scientific subdivisions (scientific research institute, department, laboratory) the corresponding departments of the medical institute and specialized [illegible]tal departments. There are 32 such associations in the republic. As pr[illegible]cal experience has shown, they create optimal conditions for bringing together scientific research and the needs of medical practice and for facilitating the introduction of the results of scientific work into the practices of public health. At the same time they are excellent bases for the preparation of doctors and medical students. In addition, these associations play the role of republic centers for highly-trained specialized medical services to the population. As an example of this we can cite the centers of cardiology, obstetrics, oncology, gastroenterology, pulmonology, kidney transplants, and others.

Many scientific-educational-applied science associations (cardiovascular surgery, trauma and orthopedics) have become inter-republic centers, and some have acquired national significance, as for example the center for hepatology, which on the basis of decisions by the USSR Health Ministry annually conducts courses to increase the knowledge of professors and instructors of all medical institutes in the country, and the center for oncology, which is a leader in the field of cytological diagnosis of cancer.

Medical science in the republic is successfully dealing with urgent problems in the interest of the national economy utilizing economic contracts. During the years of the 10th Five-Year Plan their volume equalled 4 million rubles. Thus, for example, Latvian medical scientists participated in the creation of the first Soviet RAF-22-03 reanimobile, the mass production of which began in 1977.

One of the characteristic directions for the development of medical science in the republic is the elaboration of comprehensive scientific programs together

with the institutes of the Latvian SSR Academy of Sciences. At the present time such comprehensive research is being conducted on 23 scientific topics. Experience has shown that such a form of scientific cooperation encourages a higher level of research and is characterized by great productivity. As a result, new and promising directions are given birth to from various areas of science. This is the way medical biomechanics and magnetobiology started in the republic. Research related to the problems of viral hepatitis and the common cold has been elevated to a new level.

In Soviet Latvia a long-term program to improve public health administration is being implemented successfully. We are approaching this from the point of view that that the continued development of public health, which has been transformed into a complex and extensive branch, is possible only on a scientific basis. Latvian doctors, in creative cooperation with mathematicians, cyberneticists, economists and demographists have enriched the science of public health administration with an entire series of theoretical research, the introduction into practice of which will significantly increase the effectiveness of trained medical aid to the population.

We give special attention to improving the operations of outpatient clinics, which provide medical services to the greatest masses of the people.

In many outpatient departments of hospitals and clinics physician's offices are equipped with modern equipment. Systems of patient-made medical appointments and dictaphone orders for medical services at home have been introduced. A change in the work regimen of outpatient departments and clinics, implemented under the control of the republic's ministry of health, enabled us to provide medical aid to the population after work hours and on vacation days. Leading professors and docents regularly consult with patients and render organizational-methodological aid in Riga's clinics. Each rayon of the republic is also assigned a brigade of specialists-doctors.

The creation within the Latvian SSR Ministry of Health of a republic NOT [Scientific organization of labor] center, which realizes the centralized introduction of new elaborations into practice in public health, has enabled us to introduce 4,000 different organizational-technical improvements in over 300 medical facilities in the republic during the last two five-year plans. This involved the efficient organization of physician places in clinics, the centralized dispatch of medications and sterile bandage materials to hospitals, and improvements in the form and movement of documents and in the utilization of organizational resources. As a result physicians and nurses had thousands of additional hours to deal directly with their patients.

At the present time many health services in the republic have automated management systems which enable them to monitor the state of health of patients, to evaluate the effectiveness of treatment and diagnosis and organizational-methodological measures at many levels of medical aid.

In our republic for the first time in the country it has become traditional to have meetings of ministry administrators, chief specialists, leading scientists and chief physicians with the republic's residents directly in enterprises, at construction sites, in kolkhozes and in educational institutions. This helps us to determine the needs of the people and to efficiently eliminate short-

comings. Improvements in operations are facilitated by regular meetings of our ministry's board away from home.

A new, and as experience shows, extremely effective form of work is the joint meetings of the ministry's board with the boards of other ministries and departments.

The medical workers of Soviet Latvia are actively participating in the movement toward a communist attitude toward work and in socialist competition.

Within the system of the republic's health ministry socialist competition has become extensive, under the motto "For good quality work in each work place," as well as for a worthy greeting of the USSR's 60th anniversary. Eighty five percent of the workers in public health in the republic are participating in this movement. Among our doctors over 27,000 are shock workers of communist labor. The best labor collectives each year are awarded certificates from the Central Committee of the Latvian CP, the Latvian SSR Council of Ministers, the Latvian Republic Trade Union Council and the Central Committee of the Latvian Komsomol, and are then inscribed in a book of merit of leaders in the 11th Five-Year Plan at the VDNKh [Exposition of economic achievements] of the Latvian SSR. The best workers are awarded orders and medals as well as "Excellent public health worker" pins; they are given honorary titles.

We make increased demands regarding the professional training of medical workers, their level of citizenship, their feeling of duty to the people and their moral-ethical and deontological qualities. We are striving toward medical service which combines the thorough professional knowledge of the physician, experience and compassion for anyone in need of help.

These questions are extensively discussed in local party organizations of all medical facilities and in the aktivs of medical workers in cities and rayons, as well as by the ministry's board. Cases of bribes, extortion and the use of the job for gain were sharply criticized. People who taint the honor of the profession and who violate the physician's oath of the USSR will be treated with the harshest of measures of punishment, including a revocation of the calling of Soviet physician.

We still have many reserves for improving the quality of medical aid to the population. However, it is important not only to see and know one's shortcomings, difficulties and unsolved problems but also to eliminate them.

As we have said, many magnificent hospitals have been built in the republic. Meanwhile people still must wait their turn for hospitalization. Despite the intensive building of new clinics and outpatient departments and the growing number of doctors the lines to some specialists are decreasing slowly.

We still have difficulties with supplying the population with eyeglasses and with some medications.

We would like to receive more help from other ministries and departments to solve a number of urgent problems directed at improving health protection for the population. In particular, the ministries of the meat and dairy industries and of the fruit and vegetable economy of the republic did not completely provide the assortment of foodstuffs for young children as called for by the

resolution of the Latvian SSR Council of Ministers dated 19 November 1976, "On Supplementary Measures to Protect the Health of Mother and Child in the Latvian SSR."

Despite the fact that each year goals to introduce hospitals and outpatient departments and clinics into operation are met, the allocated limits of capital investments are not assimilated fully. New structures within the public health system are unsatisfactorily supplied with reinforced concrete and other building materials prepared by the industrial enterprises of the republic's ministry of building and ministry of industrial building materials. It is for this reason that building is slow on the oncological clinic in Riga and the central city hospitals in Liyepa and Daugavpils. We are seriously concerned about the course of building of the clinic in Yekabpils, where as a result of the shortage of building materials and laborers capital investments have been assimilated by only one-half this year. The building of a large clinic in Valmiyere is beginning to lag noticeably behind the plan.

We are very dissatisfied with the quality of renovation work. Last year only seven of 32 renovation-construction administrations of the republic's renovation and building trust of the Latvian SSR Ministry of Communal Economy fulfilled the plan on our structures. The executive committees of local soviets of workers' deputies in Liyepa, Yelgava, Yurmala, Yelgavskiy, Balvskiy, Valkskiy, Talsinskiy and Limbazhskiy rayons organized the renovation of health facilities unsatisfactorily. The Riga city and republic general building trust has been very slow about capital repairs of the engineering network (heat supply, water and sewer lines).

Similar shortcomings must be eliminated as soon as possible in order to successfully deal with the responsible goals set for Soviet public health workers by the 26th party congress and the resolution of the CPSU Central Committee and USSR Council of Ministers, "On Supplementary Measures to Improve the Health Protection of the Population."

A great deal remains to be done. During the years of the 11th Five-Year Plan the material base will continue to grow stronger. New hospitals, hospital wings and clinics will be built. These will include a large oncological center in Riga, new hospitals in Liyepa, Daugavpils, and Rezekne and new clinics in Riga, Yekabpils and Valmiyera. The detachment of Latvian doctors will be supplemented by 2,200 doctors and pharmaceutical chemists, over 6,500 midwives, physician's assistants and nurses. The quality of medical services to the population will improve in hospitals and outpatient departments and clinics alike, which we feel are the "hot links" in the public health system.

During the current five-year plan children and adolescents, women and workers of the leading branches of industry and agriculture must be fully encompassed by the health clinic system. Special concern will be demonstrated for the health protection of veterans of the Great Fatherland War.

The board of the ministry and the party bureau are making every effort to further improve the operations of the public health administration apparatus. Together with party and soviet organs and the republic trade union committees of medical workers the ministry is implementing persistent work to mobilize the collectives of intermediate institutions to solve the problems related to increasing the effectiveness of health protection of the population and to prolonging the active creative life of the Soviet people.

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60TH ANNIVERSARY OF THE FORMATION OF THE USSR: SOVIET PEOPLE'S HEALTH

Moscow VESTNIK STATISTIKI in Russian No 11, 1982 pp 57-62, 79-80

[Statistics]

[Text] 1. Main Indicators for Development of Public Health
(for end of year, in thousands)

	1922	1940	1965	1980	1981
No of physicians of all specialties	21.1	155.3	554.2	997.1	1033.9
No of middle-echelon medical personnel	73	472	1692	2814	2880
No of hospitals*	4.9	13.8	26.3	23.1	23.1
No of hospital beds	193	791	2226	3324	3384
No of medical establishments providing outpatient and polyclinic facilities**	-	36.8	36.7	36.1	36.5
No of gynecologic consulting facilities, pediatric polyclinics and outpatient departments (independent and as part of other establishments)	0.3	8.6	19.3	24.3	24.9
No of beds (medical and obstetric) for pregnant women and confinements	6.8	147.1	227.0	230.4	233.6

* The decrease in the number of establishments providing hospital and outpatient and polyclinic facilities is explained by the reorganization and amalgamation of these establishments.

** Medical establishments providing outpatient and polyclinic facilities include all medical establishments handling outpatients (polyclinics, outpatient departments, dispensaries, polyclinic departments at medical establishments, medical health points and so forth).

All citizens of the USSR are provided with free, universally accessible, and highly qualified health care.

One of the most important features of Soviet public health is the emphasis on prevention. In 1981, prophylactic examinations were conducted in 115 million individuals, and 49 million were under dispensary observation.

2. Numbers of Hospital Beds Available for the Public, by Union Republics

	Numbers of hospital beds per 10,000				
	1922	1940	1965	1980	1981
USSR	14.2	40.2	95.8	124.9	126.0
RSFSR	16.3	43.3	97.6	129.6	130.8
Ukrainian SSR	12.6	37.7	94.0	125.4	126.9
Belorussian SSR	7.9	32.6	92.4	125.2	126.1
Uzbek SSR	6.0	30.1	92.4	113.1	115.2
Kazakh SSR	5.7	39.5	102.6	130.1	130.8
Georgian SSR	13.6	36.0	84.4	107.1	107.0
Azerbaijan SSR	11.0	37.8	85.7	96.8	97.1
Lithuanian SSR	-	30.0	88.9	119.8	120.8
Moldavian SSR	4.5	24.6	89.4	120.0	121.6
Latvian SSR	-	63.0	115.1	136.8	137.7
Kirghiz SSR	8.5	24.1	91.1	119.7	120.7
Tajik SSR	1.1	28.6	87.8	98.8	101.3
Armenian SSR	9.9	30.1	79.4	83.4	83.9
Turkmen SSR	1.5	41.6	90.6	104.5	106.1
Estonian SSR	-	47.7	110.1	124.1	125.8

3. Availability of Physicians of All Specialties, by Union Republics

	Numbers of physicians per 10,000				
	1922	1940	1965	1980	1981
USSR	1.6	7.9	23.9	37.5	38.5
RSFSR	1.4	8.2	24.8	40.3	41.4
Ukrainian SSR	2.5	8.4	24.3	36.5	37.8
Belorussian SSR	1.2	5.7	21.8	33.9	34.5
Uzbek SSR	0.9	4.7	17.0	28.5	29.7
Kazakh SSR	0.5	4.3	18.7	31.8	32.7
Georgian SSR	3.2	13.3	35.0	48.1	49.6
Azerbaijan SSR	2.6	10.0	21.8	33.4	33.9
Lithuanian SSR	-	6.7	21.5	38.9	39.8
Moldavian SSR	1.6	4.2	17.9	31.4	32.6
Latvian SSR	-	13.2	31.2	43.9	44.9
Kirghiz SSR	0.5	3.8	19.1	29.1	30.0
Tajik SSR	0.2	4.1	15.0	23.5	24.2
Armenian SSR	1.7	7.5	26.7	34.8	34.8
Turkmen SSR	0.9	7.6	21.2	28.3	28.6
Estonian SSR	-	10.0	29.5	41.6	42.4

The Soviet Union now has more than 1 million physicians, or more than one-third of all physicians in the world; the USSR is first in the world in terms of the numbers of physicians available for the public.

4. Availability of Middle-Echelon Medical Personnel

	Number of middle-echelon medical personnel per 10,000			
	1940	1965	1980	1981
USSR	24.0	72.8	105.7	107.3
RSFSR	26.1	77.0	114.0	115.5
Ukrainian SSR	24.1	72.8	103.1	104.7
Belorussian SSR	19.7	65.4	97.6	99.4
Uzbek SSR	18.2	51.8	83.5	84.6
Kazakh SSR	18.6	63.5	99.8	102.0
Georgian SSR	25.6	82.3	111.9	114.0
Azerbaijan SSR	22.5	67.4	84.3	85.4
Lithuanian SSR	6.9	64.7	108.3	110.7
Moldavian SSR	9.8	65.0	95.2	98.3
Latvian SSR	18.7	83.5	115.9	117.7
Kirghiz SSR	16.1	58.8	86.3	87.9
Tajik SSR	17.0	42.4	65.0	65.5
Armenian SSR	17.1	66.0	81.0	84.7
Turkmen SSR	35.5	68.6	78.4	79.1
Estonian SSR	14.1	87.2	105.0	108.1

5. Growth Rates in Availability of Physicians and Hospital Beds for the Urban and Rural Populations, 1965-1981 (1965 = 100)

	Per 10,000			
	Physicians, all specialties		Hospital beds	
	Urban	Rural	Urban	Rural
USSR	142	180	118	150
RSFSR	146	188	120	161
Ukrainian SSR	134	177	121	153
Belorussian SSR	132	156	124	147
Uzbek SSR	138	219	103	142
Kazakh SSR	156	198	115	141
Georgian SSR	136	140	119	132
Azerbaijan SSR	127	176	98	135
Lithuanian SSR	152	193	122	149
Moldavian SSR	136	177	119	142
Latvian SSR	137	150	115	126
Kirghiz SSR	156	158	118	145
Tajik SSR	152	184	103	131
Armenian SSR	111	158	101	112
Turkmen SSR	131	148	107	134
Estonian SSR	135	146	114	115

6. Number of Hospitals, by Union Republics

	1940	1965	1980	1981
USSR	13,793	26,303	23,107	23,072
RSFSR	8,477	13,801	12,472	12.455
Ukrainian SSR	2,498	4,879	3,843	3,830
Belorussian SSR	514	1,057	873	870
Uzbek SSR	380	1,182	1,153	1,165
Kazakh SSR	627	1,876	1,695	1,690
Georgian SSR	314	650	459	452
Azerbaijan SSR	222	724	756	754
Lithuanian SSR	77	287	204	200
Moldavian SSR	109	365	337	336
Latvian SSR	89	227	183	183
Kirghiz SSR	112	284	265	267
Tajik SSR	121	264	281	291
Armenian SSR	96	258	171	167
Turkmen SSR	99	251	270	272
Estonian SSR	58	198	145	140

The decrease in the number of hospitals is explained by the amalgamation of sector hospitals.

7. Numbers of Individuals Admitted to Hospitals, by Union Republics

	Thousands			Per 100		
	1965	1980	1981	1965	1980	1981
USSR	47,289	62,777	64,082	20.5	23.7	24.0
RSFSR	26,654	33,526	34,158	21.0	24.2	24.5
Ukrainian SSR	9,538	12,556	12,824	21.0	25.2	25.6
Belorussian SSR	1.662	2,430	2,457	19.3	25.3	25.4
Uzbek SSR	1,970	3,534	3,667	19.3	22.1	22.4
Kazakh SSR	2,569	3,633	3,682	21.6	24.3	24.3
Georgian SSR	715	968	946	16.0	19.2	18.7
Azerbaijan SSR	727	1,015	1,053	15.9	16.5	16.8
Lithuanian SSR	478	704	727	16.1	20.5	21.1
Moldavian SSR	605	888	912	18.1	22.3	22.7
Latvian SSR	470	600	613	20.7	23.8	24.2
Kirghiz SSR	525	843	860	20.4	23.3	23.4
Tajik SSR	407	785	827	16.2	19.8	20.3
Armenian SSR	382	464	477	17.3	14.9	15.1
Turkmen SSR	327	532	569	17.3	18.5	19.4
Estonian SSR	260	299	310	20.1	20.3	20.8

8. Number of Medical Establishments Providing Outpatient and Polyclinic Facilities, by Union Republics

	1940	1965	1980	1981
USSR	36,843	36,696	36,122	36,452
RSFSR	20,527	19,766	18,662	18,624
Ukrainian SSR	7,737	6,288	5,954	5,995
Belorussian SSR	1,561	1,421	1,319	1,313
Uzbek SSR	1,187	1,669	2,209	2,351
Kazakh SSR	1,059	2,158	2,366	2,451
Georgian SSR	1,545	1,419	1,333	1,340
Azerbaijan SSR	931	980	1,069	1,108
Litnuanian SSR	352	466	401	403
Moldavian SSR	337	389	559	573
Latvian SSR	141	471	346	344
Kirghiz SSR	319	343	352	359
Tajik SSR	245	302	465	484
Armenian SSR	268	440	475	479
Turkmen SSR	360	329	363	381
Estonian SSR	274	255	249	247

9. Numbers of Individuals Consulting Physicians on an Outpatient Basis and House Calls Made by Physicians, by Union Republics

	Thousands			Number of calls per inhabitant		
	1965	1980	1981	1965	1980	1981
USSR: total	1,563,535	2,750,511	2,850,785	6.8	10.4	10.6
including visits to establishments within the USSR Ministry of Health system	1,464,282	2,622,583	2,719,993	6.3	9.9	10.1
RSFSR	838,679	1,396,708	1,440,221	6.6	10.1	10.3
Ukrainian SSR	307,707	543,686	565,164	6.8	10.9	11.3
Belorussian SSR	49,523	100,054	103,242	5.8	10.4	10.7
Uzbek SSR	48,254	131,351	138,920	4.7	8.2	8.5
Kazakh SSR	55,690	124,520	130,689	4.7	8.3	8.6
Georgian SSR	31,531	48,475	49,872	7.0	9.6	9.8
Azerbaijan SSR	28,752	52,963	56,369	6.3	8.6	8.9
Lithuanian SSR	18,317	42,731	44,641	6.2	12.5	12.9
Moldavian SSR	13,355	32,618	34,847	4.0	8.2	8.7
Latvian SSR	17,051	29,217	29,689	7.5	11.6	11.7
Kirghiz SSR	13,383	27,812	29,359	5.2	7.7	8.0
Tajik SSR	8,975	27,916	29,885	3.6	7.1	7.3
Armenian SSR	13,191	27,816	28,826	6.0	9.0	9.1
Turkmen SSR	10,345	20,996	22,096	5.5	7.3	7.5
Estonian SSR	9,529	15,717	16,173	7.4	10.6	10.9

10. Number of Gynecologic Consulting Facilities and Pediatric Polyclinics and Outpatient Departments (independent and as part of other establishments), by Union Republics

	1922	1940	1965	1980	1981
USSR	346	8,603	19,333	24,293	24,881
RSFSR	197	4,917	10,956	12,586	12,654
Ukrainian SSR	135	1,821	4,157	4,951	5,113
Belorussian SSR	6	311	503	623	647
Uzbek SSR	-	276	618	1,443	1,524
Kazakh SSR	-	269	900	1,450	1,484
Georgian SSR	-	283	445	551	616
Azerbaijan SSR	6	166	274	651	740
Lithuanian SSR		51	205	235	235
Moldavian SSR	1	40	222	225	243
Latvian SSR		109	217	238	245
Kirghiz SSR	-	66	220	329	347
Tajik SSR	-	71	122	356	362
Armenian SSR	1	60	232	236	241
Turkmen SSR	-	106	147	262	273
Estonian SSR		57	115	157	157

11. Number of Beds (Medical and Obstetric) for Pregnant Women and Confinements, by Union Republics (thousands)

	1922	1940	1965	1980	1981
USSR	6.8	147.1	227.0	230.4	233.6
RSFSR	5.1	90.7	118.3	113.1	114.1
Ukrainian SSR	1.13	35.0	47.8	39.7	39.7
Belorussian SSR	0.2	5.4	7.5	7.3	7.6
Uzbek SSR	0.09	2.8	11.0	19.2	20.4
Kazakh SSR	0.09	4.3	14.7	16.4	16.4
Georgian SSR	0.06	1.9	4.2	4.3	4.3
Azerbaijan SSR	0.1	2.0	4.3	6.6	6.6
Lithuanian SSR		0.4	2.5	2.5	2.5
Moldavian SSR	0.02	0.6	4.4	3.6	3.9
Latvian SSR		0.8	1.5	1.6	1.6
Kirghiz SSR	0.02	0.8	3.2	4.5	4.4
Tajik SSR	-	0.6	2.2	4.0	4.4
Armenian SSR	0.01	0.7	2.7	2.8	2.8
Turkmen SSR	0.01	0.8	1.9	3.8	3.9
Estonian SSR		0.3	0.8	1.0	1.0

12. Number of Pediatric Hospital Beds (children up to 14 years inclusive), by Union Republics (thousands)

	1940	1960	1980	1981
USSR	89.7	260.1	567.2	574.2
RSFSR	57.4	157.0	296.3	298.3
Ukrainian SSR	15.1	45.9	89.8	90.3
Belorussian SSR	2.0	6.3	16.3	16.5
Uzbek SSR	2.7	10.3	44.5	46.8
Kazakh SSR	5.6	12.3	42.8	43.4
Georgian SSR	1.0	3.5	8.1	8.2
Azerbaijan SSR	.7	4.0	11.1	11.0
Lithuanian SSR	0.5	2.8	7.0	7.1
Moldavian SSR	0.3	4.2	9.2	9.5
Latvian SSR	0.9	2.8	4.4	4.6
Kirghiz SSR	0.4	2.9	11.8	11.6
Tajik SSR	0.7	2.0	11.9	12.7
Armenian SSR	0.5	2.2	3.8	3.9
Turkmen SSR	0.7	2.0	7.4	7.4
Estonian SSR	0.2	1.9	2.8	3.0

13. Sanatoria and Rest Homes

	1939	1965	1980	1981
Number of sanatoria, preventoria and guest houses providing treatment	2,166	3,628	4,909	5,012
with beds:				
thousands	255	479	763	781
per 10,000 of population	13.0	20.6	28.6	29.0
Number of rest homes, guest houses and leisure bases, and tourist bases	1,434	4,452	8,232	8,511
with facilities for:				
thousands	214	549	1,375	1,408
per 10,000 of population	10.9	23.6	51.6	52.4

In 1981 some 2,600 one- and two-day rest establishments with a total of 176,000 places were functioning in the USSR.

14. Numbers of Those Treated and Provided with Rest Facilities at Sanatoria and Rest Homes (thousands)

	1950	1965	1980	1981
Total treated and provided with rest facilities at sanatoria and rest homes	3,785	11,316	40,040	41,995
At sanatoria and guest houses providing treatment	1,654	2,979	5,158	5,341
At sanatoria-preventoria	198	718	2,876	3,034
At resort polyclinics, with course tickets (authorization)	69	625	1,064	1.074
At rest homes and guest houses	1,824	3,988	5,331	5,317
At leisure bases	-	1,009	3,108	3,314
At tourist bases	40	1,997	22,503	23,915

In 1981 some 59 million workers and members of their families, including 42 million individuals taking advantage of prolonged treatment and rest, 7 million people on one- and two-day rest visits, and 10 million people enjoying tourist facilities on their rest days, were treated and took their leisure at sanatoria, leisure establishments and tourists trips and bases. Of these, about one-third were given prolonged treatment and rest (about 80 percent at trade union health resorts) and received their travel authorization through social security funds and the state budget, either gratis or at bargain prices of 30 to 50 percent of cost. In addition, hundreds of thousands of workers received travel authorizations gratis or at bargain prices through enterprise social-and-cultural measures and funds.

15. State Capital Investments in Nature Conservancy Measures and the Rational Utilization of Natural Resources (in comparable prices, millions of rubles)

	1971-1975		1976-1980		
	Total	Annual average	Total	Annual average	1981
Nature conservancy measures and the rational utilization of natural resources: total including:	6,225	1,251	9,281	1,856	1,845
conservation and rational utilization of water resources	4,642	928	7,102	1,420	1,362
conservation of environmental air	622	124	837	167	141

During the 10th Five-Year Plan total expenditure on nature conservation and the rational utilization of natural resources (including operational expenses in the timber industry) amounted to more than R26 billion; in 1981 the total was more than R8 billion.

16. Expenditures on Labor Protection Measures (millions of rubles)

1971-1975		1976-1980		
Total	Annual average	Total	Annual average	1981
8,206	1,641	11,157	2,231	2,294

In addition during the 10th Five-Year Plan R8 billion were spent on the manufacture of individual protective means and supplying a number of categories of workers in the dairy industry and therapeutic-prophylactic catering, in 1981 the figure was more than R2 billion.

In 1981, total production accidents in the national economy fell 29 percent compared with 1975. The Soviet Union is numbered among the countries with a low level of production accidents.

10. Numbers of Physicians and Middle-Echelon Medical Personnel at the end of 1981*

	No of physicians, all specialties		No of middle-echelon medical personnel	
	thousands	per 10,000	thousands	per 10,000
USSR	1,033.9	38.5	2,879.6	107.3
including by cities:				
Alma-Ata	8.6	86.6	13.9	140.4
Ashkhabad	2.9	88.0	3.8	114.2
Baku	11.6	72.6	20.6	128.8
Vilnius	3.7	72.4	7.2	141.5
Gor'kiy	8.2	60.0	16.7	121.4
Dnepropetrovsk	6.4	56.9	11.5	102.4
Donetsk	6.7	62.4	13.6	127.5
Dushanbe	4.0	77.3	7.3	140.9
Yerevan	7.3	67.1	12.3	113.4
Kazan'	6.4	62.7	11.7	114.5
Kiev	18.5	81.3	32.3	141.5
Kishinev	4.9	87.4	8.9	159.0
Kuybyshev	7.6	60.9	16.1	129.0
Leningrad	38.8	82.6	67.8	144.2
Minsk	9.4	67.7	18.0	130.4
Moscow	82.2	99.9	144.0	175.1
Novosibirsk	8.6	62.7	16.2	117.5
Odessa	9.0	84.2	16.5	154.5
Omsk	6.9	63.8	14.6	135.8
Perm'	6.1	58.8	11.7	112.6
Riga	6.4	74.8	12.7	149.2
Sverdlovsk	8.1	63.5	15.9	125.4
Tallinn	3.0	64.6	6.2	134.1
Tashkent	13.7	72.5	25.1	133.4
Tbilisi	13.1	119.2	16.6	151.6
Ufa	6.3	61.3	11.5	112.6
Frunze	4.5	80.6	8.2	147.0
Khar'kov	9.5	64.0	17.8	119.7
Chelyabinsk	6.3	58.0	12.9	119.7

*In this and the following table, figures are shown by cities, including the urban populations administered by the gorsovet.

11. Numbers of Medical Establishments and Hospital Beds at End of 1981

	No of medical establishment providing outpatient and polyclinic facilities	No of hospitals	No of hospital beds thousands	No of hospital beds per 10,000
USSR	36,452	23,072	3,384.0	126.0
including by cities:				
Alma-Ata	77	50	16.6	166.9
Ashkhabad	34	19	5.5	164.4
Baku	202	90	21.2	132.9
Vilnius	27	19	9.5	186.4
Gor'kiy	120	70	19.8	144.4
Dnepropetrovsk	107	42	16.1	142.7
Donetsk	60	50	17.6	165.0
Dushanbe	58	26	7.3	141.1
Yerevan	107	39	10.7	99.3
Kazan'	104	56	15.6	153.2
Kiev	194	90	31.5	138.1
Kishinev	94	28	9.6	170.7
Kuybyshev	109	64	16.2	129.7
Leningrad	472	140	56.2	119.5
Minsk	108	32	17.8	128.8
Moscow	920	228	113.4	137.9
Novosibirsk	129	63	19.7	142.9
Odessa	104	43	13.0	121.6
Omsk	95	52	15.6	144.6
Perm'	81	46	15.2	147.1
Riga	63	35	14.0	164.5
Sverdlovsk	81	62	20.5	161.1
Tallinn	40	22	6.6	142.1
Tashkent	239	83	27.3	145.3
Tbilisi	164	59	15.5	141.2
Ufa	69	36	15.9	155.8
Frunze	64	27	10.1	181.4
Khar'kov	135	64	21.2	142.0
Chelyabinsk	67	51	16.0	148.3

Medical establishments providing outpatient and polyclinic facilities include all medical establishments handling outpatients (polyclinics, outpatient departments, dispensaries, polyclinic departments at medical establishments, medical health points and so forth).

9642
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CARDIOLOGY RESEARCH IN THE BELORUSSIAN SSR

Minsk SOVETSKAYA BELORUSSIYA in Russian 26 Jan 83 p 4

[Article by Professor G. Sidorenko, director of the Belorussian Cardiology Scientific Research Institute, chief cardiologist of the BSSR Ministry of Health and corresponding-member of the BSSR Academy of Sciences: in the Column "Health Service", "Cardiology: Achievements and Problems"]

[Text] The questions associated with heart diseases have in recent decades outgrown the framework of a purely medical problem and are of interest to a wide public in many nations. This is essentially because of the diseases that take human lives, cardiovascular diseases firmly maintain a sad primacy.

In the developed nations, including the USSR, the life-span is increasing, while cardiovascular diseases have been "rejuvenated". It thus follows that the second half of the life of modern man is frequently clouded by disease as threatening as a sword of Damocles. It is more correctly stated that man is purused by three dark shadows: ischemic heart disease, arterial hypertension and atherosclerosis.

The socialist order and the Soviet national health-care system created favorable conditions for the formation of a single front of assault on the disease on a nation-wide scale. The importance of preventing and treating heart diseases has been stressed in the decisions of the CPSU 26th Congress and in a number of party and governmental resolutions on national health care.

These plans were realized in the creation of the All-Union Cardiology Scientific Center and the cardiologic scientific research institutes in nearly all union republics, and in the development of dispensaries, departments and clinics in polyclinics. Also enlisted in this well-balanced system are sanatorium departments for the rehabilitation of patients suffering from mycardial infarct.

A cardiology service is also under development in our republic. The Belorussian Cardiology Scientific Research Institute, dispensaries in Vitebsk, Mogilev, Grodno and Minsk and three rehabilitation departments (Krinitsa, Lettsy and Bug) were established. Forty eight cardiology departments were opened in hospitals and 134 cardiology clinics in polyclinics.

Thirty nine specialized emergency-care brigades go out on emergency calls. Methodological recommendations have been developed, making possible the uniform treatment of patients with hypertension, rehabilitation after myocardial infarct, X-ray cardiology diagnosis and so on.

The newly created cardiology dispensaries are developing work in three aspects. These are the consultative-therapeutic care of the population, rehabilitation--that is to say the restoration of the work capacity of persons suffering from myocardial infarct--and, finally, prophylaxis.

The scientific investigations in the field of cardiology are united in the form of a single republican program, whose fulfillment is monitored by a coordinating council.

I would like briefly to familiarize the readers with the results of scientific research in the current directions. I will mention first of all the complex of studies related to arterial hypertension. An hypothesis has been advanced at the Belorussian Cardiology Scientific Research Institute that links development of this wide-spread disease with inadequate processing of information.

The essence is as follows. The intensification of modern productive processes forces man to process information under a time deficit. Emotional stress can arise in such situations, accompanied by a rise in arterial pressure. Proceeding from this concept, a method was developed for recognizing the hidden forms of hypertension, and the response of arterial pressure to a dosed information load was studied.

A methodological approach to the treatment of hypertension was developed on the basis of the information theory. Not only the decline in the patients' pressure is taken into account during treatment, but also the rise in the capacity to process information. Since any work procedure involves processing of information, this is actually a matter of treatment with accontrolled rise in work capacity. This original approach is employed not only in the hospital but also under conditions of the medical-sanitary unit of the Minsk Tractor Factory. One can already now speak of an existing economic result of the developed methodology.

Arrhythmias, which are encountered in 80% of cardiac patients, are being successfully studied in the laboratories of the Cardiology Institute. Special attention is demanded by those dangerous varieties, that by complicating ischemic heart disease, may lead to severe consequences. Of especial importance is the timely recognition of the precursors of dangerous arrhythmias. It is from these premises that a portable arrhythmia detector was developed, which continuously monitors the cardiac rhythm, sending a signal concerning the threat of danger and indicating the need for immediate care. The possibilities of a new group of antiarrhythmic drugs suitable for emergency action have been tested in numerous experiments.

It is still early to speak of the clinical application of these drugs, but the results of more than 1,000 experiments convince us of their promise.

A separate task is the search for means of the rapid and convenient administration of antiarrhythmic drugs at precise dosages. Institute associates are working on this also. The aggregate of these studies comprise a medical-technological program for combating dangerous arrhythmias. When it is considered that sudden death is often associated with arrhythmias, the urgency of such a program becomes evident. Of course, an assault on arrhythmia is possible only with a developed research front. A creative contribution to the program has been made by the Production Association Integral, the Belorussian State University imeni V. I. Lenin and other institutions in our republic and nation.

The prospects for research in the field of cardiovascular-disease prophylaxis become increasingly apparent with each year. It is in this direction that a decisive break-through should be expected in the struggle with the most dangerous diseases. Here the studies of the Belorussian Cardiology Scientific Research Institute is move in the same direction with the country's cooperative research program and the efforts of cardiologists in the Comecon nations and the World Health Organization. The discovery of ischemic heart disease or hypertension in persons not suspecting their disease opens new reserves and possibilities in effective therapeutic intervention.

Especially important is prophylaxis at the stage where there is still no disease but where there are risk factors preceding the diseases. The possibility of actively and effectively influencing these factors and reducing the danger of the disease were studied at the Cardiologic Institute from the premises of control theory. The meaning of this theory consists in the quantitative evaluation of one or another risk factor in a particular person withhhis immediate notification for taking appropriate measures. A number of new devices have been developed (training equipment, ergometers, ergomonitors, etc.) that make it possible to combat the hypokinesia that is so common in modern man. Especially important is early prophylaxis, performed with consideration of the constituent features of the person. Exceptional importance is acquired by the struggle with such a solidly-demonstrated risk factor as smoking, new methods for which are sought by the scientists of the Laboratory of Social and Prophylactic Cardiology.

The originality of the current research and solutions is borne out by the more than 50 author's certificates and foreign patents for inventions. The associates of the Cardiology Scientific Research Institute have presented communications and reports at all-union and international cardiologic congresses, as well as at cardiologist forums in the USA, Japan, Finland, Yugoslavia, East Germany, the Netherlands, Hungary, France....

Th presence of agreements with 20 enterprises made it possible to commence the commercial exploitation of the institute's developments, which have been awarded prizes from a number of all-union and foreign exhibitions.

At the same time we are distinctly aware that the effectiveness of the current research is still inadequate. An especially weak point is the practical introduction of the results of scientific research. Unfortunately, the Belorussian Cardiology Scientific Research Institute does not have its own clinical base, in contrast to similar institutes in other republics. This narrows sharply our opportunities. It is sufficient to state that we can accept only 10-15 patients. For comparison we point out that, for example, the Kirghiz Cardiology Scientific Research Institute, which has its own base, provides treatment for 350 patients. The hospital does not yet have access to any of the cardiology dispensaries opened in the republic.

There should also, in our view, be studied the possibility of opening boarding houses with the Scientific Research Institute and dispensaries for newly arrived patients, which would permit a rapdi examination and procurement of the appropriate recommendations. For, in a large portion of cardiovascular patients, there is no need for hospital treatment and long exclusion from accustomed conditions. The effective examination and assignment of the appropriate out-patient treatment could increase by 25% the number of patients provided with highly-qualified hospital care. It would be useful simultaneously to construct a hostel or to assign rooms for physicians and laboratory technicians who arrive from various republic institutions for advanced training at the Belorussian Cardiology Scientific Research Institute. The absence of such resources significantly limits the training of extremely-necessary cadres.

All these questions await solution. Their significance stems with full force from the resolution recently adopted by the CPSU Central Committee and the USSR Council of Ministers "Additional Measures for the Improvement of the Health Care of the Population". Among other urgent problems, this resolution has stimulated the development of cardiology and provides solid confidence in the successful outcome of the struggle with the dangerous diseases of our time.

9942
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UNNECESSARY DELAYS IN HOSPITAL TREATMENT

Moscow MOSKOVSKAYA PRAVDA in Russian 1 Dec 82 p 2

[Article by Doctor of Medical Sciences Z. Vaynberg, chief of Urology Department of Clinical Hospital No. 67, in the column "Continuation of a Theme": "Why Overtime"]

> [Text] On 6 October the newspaper published an article by Doctor of Medical Sciences V. B. Aleksandrov "Bed-Day in Overtime". The subject was the rational utilization of the supply of beds. We continue the original conversation.

Is everything done for the rational use of the hospital bed? Yes, the surgical-hospital physician is overloaded with work. This especially relates to specialists of a so-called highly-specialized profile. Thus, the physician urologist has become a "multiple-machine operator". He examines the patient with the help of special optical devices and apparatus, conducts all labor-intensive types of X-ray examination, giving also a written interpretation of the photo. Add to this the vast field of activity in the operating room, the dressing ward, postsurgical observation, rounds and the rest of the daily work (disease history, certificates, orders, etc., etc.). Can this really be fitted into the 6.5 hours of the working day? No. Inevitably something is put off. Of course, to the benefit of neither the patient nor the physician (which should not be forgotten). Conditions are created for the unjustified delay of the patient in the hospital. Should an additional six to seven physician and nurse units be introduced into 60-bed departments, as proposed by the article's author, Aleksandrov? It would seem that this ought not be necessary, if....

The fact is that comparatively recently the hospital physician staffs were reduced by order of the USSR Ministry of Health. Whereas earlier, say, there were four physicians in a 60-bed urology department, today there are three. And the result is that one physician manages 20 patients. And if his colleague falls ill? And when still another physician is on leave? Who remains in the department? Is it possible for one physician adequately to examine, treat and manage the necessary documentation for 20 or, especially, 40 patients? Obviously not. Who suffers because of this? The patient and the state budget. Some economization--just one unit was

discharged. And in reality such an economization becomes an extravagance. Consequently, the first thing that must be quickly done is to restore the former physician staffs. First of all, in the specialized departments such as urology.

This second, extremely important question is the correct organization of the therapeutic-diagnostic process as a whole. We all know that in falling ill we turn to a physician in a polyclinic according to the place of residence or work. It is here that there occurs the first and, I would say, most important and crucial encounter between the patient and physician. It, in considerable measure, determines the entire subsequent direction of the therapeutic-diagnostic process, and sometimes the fate and life of the patient. It is this physician who decides what types of examination are necessary for establishing the diagnosis and assigns the treatment. He decides where the patient should be observed and treated--under out-patient or hospital conditions. And, thus, very much depends upon the qualifications, experience and conscientiousness of the physician and the instrumentation of the polyclinic.

New hospital buildings are continuously coming into service in our nation. Vast sums are spent for this. But is this always justified? A spot check of a number of urology hospitals showed that from 30 to 42% of the patients in the hospitals are hospitalized solely for conducting one or another examination, which with the correct organization of polyclinic work should be conducted in the polyclinic itself.

And more. Patients prior to an operation (if they needed one) spent 10-15 days in unpleasant anticipation. If they are hospitalized after complete examination in the polyclinic, the number of patients in the hospitals can be reduced by 30-40% and the number of beds need not be increased. And up to three times more patients can be operated on. For it is no secret that people now sometimes wait one to two and more months for their "turn" to be hospitalized for surgical treatment. Is not this the way to use internal resources? There is no doubt that within the limits of Moscow and the nation as a whole this will permit the savings of vast sums of money and the reduction (or the avoidance of a 25-30% increase) in the bed supply.

Of course, the time of stay of a patient in the hospital must be minimized. On the indispensable condition that the interests and health of the patient can not and must not be jeopardized. Definite constructive actions are required here. In what should they consist? Primarily, the so-called highly-specialized polyclinic physician must conduct conscientiously the entire complex of examinations in accordance with the regulations concerning the volume and methods of examinations conducted under out-patient conditions developed and approved by the Health-Care Main Administration of the Moscow City Soviet Executive Committee. A diagnostic base should be organized in one of the polyclinics for 10-13 rayons with all laboratories, where patients could be sent for special examination. Then both the patient and the physician will be able, under polyclinic conditions, to perform the timely diagnosis of the various diseases. And only in individual cases can the need arise for hospital examination.

A very close contact between the polyclinic and hospital is absolutely necessary. This will determine the precision and clarity in the solution of questions concerning the hospitalization of each patient.

I would like to dwell a moment on still another question, on which it is not customary to "speak out loud". I have in mind the principle of material incentive, which finds ever wider and more rational application in the various branches of the national economy, but not in health care. I foresee objections. However, it is easiest to take in advance a negative position and say that such a formulation of the question is impermissible in the given instance. What does it mean that one physician works well and another poorly? That one treats correctly and the other does not? This is not an issue, although, of course, there are more and less conscientious physicians.

The work of a therapeutic institution as a whole or of its subdivisions is judged by fully-defined numerical parameters. For example, the number of days spent by patients in the department in general and with specified diseases in particular. Or: the number of patients treated in a department per year, what is the presurgical bed-day and so on. These and other figures objectively reflect the work of the department supervisor and physicians. These figures make it possible to compare the work of different institutions. In Moscow, and indeed in other cities, there are hospitals and departments in which these and other figures differ sharply from one another. This is to be expected: some work better and others worse. With identical diseases patients spend 10-12 days in one hospital and 18-20 in another; in one they wait 2-4 days for an operation, in another 10-15 and more days. This means that it is possible to judge objectively the work of the medical personnel.

A department supervisor can strictly control the thoroughness of a patient examination in a polyclinic and follow up on the correctness of the hospitalization of patients. But a patient can be placed without specified data and all that is necessary in the hospital can be provided, and instead of 10 days the patient will lie for 20 days and more. The shape of the departmental work parameters as a whole will also depend upon the activity of the medical personnel, and each extra day spent in the hospital is state money. And hundreds, thousands of days? Consequently, the work of one or another physician and of the collective as a whole can be evaluated objectively. One would think that a 30-50 percent increase in wages for physicians working conscientiously (from all points of view) is both reasonable and economically advantageous. Such an approach would be a stimulus both to good and to poor workers in the collective. And the criterion of evaluation can be worked out and defined as desired.

It is evident that more intense, more prolonged work is required for better qualitative parameters. However, even this will be justified, since the physician need not combine jobs in another therapeutic institution. The expenditures for supplementary wages of the medical personnel will be negligible compared with the economization with respect to the bed supply.

None of this requires the addition of supplemental physician and, perhaps, nursing staffs. The utilization of internal resources will make it possible to solve correctly many important problems. One should think that performing such an experiment in three to five rayons in the capital would be justified.

9942
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QUESTIONS IN THE MAINTENANCE OF THE HEALTH OF THE ELDERLY

Moscow MEDITSINSKAYA SESTRA in Russian No 10, Oct 82 pp 27-30

[Article by N. V. Dmitriyeva, All-Union Scientific Research Institute of Social Hygiene and Organization of Public Health imeni N. A. Semashko, Moscow]

[Text] The Party considers the transformation of agriculture into a highly-developed branch of the economy as a most important nation-wide affair. For the achievement of this goal, the material-technical base has been strengthened and applied technology improved. In recent years in various regions of the nation, agroindustrial complexes have been constructed with the introduction of technological schemes involving many production processes and designed for the procurement of agricultural products by industrial methods. The construction of new large animal-breeding complexes, modern poultry farms, mechanized hothouse combines and so on has been stipulated with the aim of further improving the supply of the nation with food and certain types of raw material.

In recent years, the involvement in social production of pensioners wishing to work has become a highly topical question. Undoubtedly, the level of activity of this segment of the population can be raised by involving both the contingents of relatively healthy people and of those that suffer chronic diseases but have retained a certain measure of work capacity. Health-care workers are called upon to play no small role in this. The necessity arises for not only expanding the volume of medical care provided but also introducing certain organizational measures directed at improving the therapeutic-prophylactic service.

It is known that the conditions existing in rural areas have specific features that, in particular, determine certain patterns in the population's use of medical care. A sampling investigation conducted in a number of RSFSR administrative regions has established that 65.8% of the inhabitants of rayon centers of 60 years of age and older used medical care in the course of a year. Out-patient and polyclinical care alone was required by 54.6%; hospital care, by 1.2%; emergency, 2 %; and all forms of care were received by 8.0% of the population of the indicated regions; at the same time, the number not using medical care comprised 34.2%.

With distance from the rayon center, the number of people of 60 years of age and older using emergency care declined to 0.5%; at tne same time the fraction of people receiving all forms of care, including hospital, remaining nearly unchanged.

It was established that the fraction of people not using medical care significantly increased with distance from the site of residence to the therapeutic-prophylactic institutions of the rayon center: to 40.1% in the service zone of physician out-patient clinics and 52% in remote settlements. In this connection, it is necessary to elucidate the reasons for the nonuse of therapeutic-prophylactic institutions by such a large portion of the elderly population.

One such reason is the difficulty in reaching a physician. For many elderly people a distance of several tens of kilometers to the central rayon hospital is a difficultly-surmounted barrier for visiting a therapeutic institution. Among the other reasons for the nonuse of medical care are self-treatment and a habituation to one's condition, insofar as the course of most chronic diseases is characterized by a periodic alternation of compensation for disrupted functions and exacerbations of the pathological processes. Many elderly people turn to a physician less frequently in connection with the fact that they consider their general state to be a natural consequence of age. The non-use of medical care can in definite degree be explained by the fact that, in connection with the cessation of working activity, elderly people no longer have a need to obtain a temporary release from work due to illness.

People 60 years of age and older most frequently used the out-patient and polyclinical care.

They most frequently sought care in connection with diseases of the circulatory system, organs of respiration, digestion and the nervous system and sense organs, urogenital organs and, also, as a result of accidents, poisoning and traumas. For example, the usage by persons of 60 years of age and older due to diseases of the circulatory system comprised 103.0 per 1,000 inhabitants of the given age. The most prominent place here was occuped by ischemic heart pain, hypertension, strokes and diseases of the veins. The fraction of these diseases as a whole with respect to class comprised 89.5%; moreover, in most instances they occurred against a background of one or another accompanying pathology. Thus, chronic rheumatic heart diseases in 52.1% of the cases were combined with general atherosclerosis; in 62.8% of the cases, ischemic heart disease was accompanied by thromboangiitis obliterans and other diseases of the peripheral vasculature; in 85.2% of the cases, myocardial infarct developed against a background of atherosclerotic cardiosclerosis. Undoubtedly, the presence of a combined pathology in elderly people creates difficulties in diagnosis and prolongs the time of treatment.

Chronic bronchitis, especially in men, chronic pneumonias, emphysema and pneumosclerosis were the most wide spread in the class of respiratory-organ

diseases (61.1°/oo). The frequency of usage on account of digestive-organ diseases comprised 50.0°/oo. A leading place in their structure was occupied by cholelithic disease and cholecystitis, followed by gastro-duodenal pathology, among which the most widespread were gastrites and duodenites. Dynamic intestinal obstruction and strangulation of a hernia were frequently encountered in people of elderly and advanced age.

Among the diseases of the nervous system and sense organs (28.8°/oo), the greatest number of usages was associated with diseases of the central and peripheral nervous system, as well as ocular diseases. Usages increased on account of conunctivites, senile cataract and glaucoma. Refraction and accomodation anomalies were recorded frequently. Usage increased in the older age groups in connection with incipient presbyopia, which compels resort to a physician for correction.

The difficulties in organizing the medical service of the elderly population in rural areas are associated not only with the high prevalence of combined pathology, but also in considerable degree with the accessibility of medical care. Thus, the inhabitants of the rayon center in 95.6% of the cases received specialized out-patient and polyclinical care in a central rayon hospital and in 4.4% of the cases turned for highly-specialized medical care to physicians of oblast and city therapeutic-prophylactic institutions. These parameters comprised 30.2 and 2% respectively for the residents of the service zone of divisional hospitals. This contingent was primarily served by general physician care (58.1%) and, also independent paramedical (6.4%) and paramedical care with physician consultation (3.1%). It should be noted that the proportionate participation of paramedics in providing medical care to elderly persons increased considerably with increase in distance. Independent paramedical care was provided to residents of remote settlements in 70.7% of the cases, paramedical with physician consultation in 22%, while the fraction of specialized care fell to 6.1% and that of highly-specialized, to 1.2%.

It should be noted that the organization of medical service for persons of older ages in the rural areas involves considerable difficulties. Whereas the performance of specialized geriatric receiving in polyclinics and the organization of geriatric clinics implementing organizational and methodological supervision have gained recognition in the cities, somewhat different forms and methods of work must be sought in rural areas.

In the first place, measures must be developed and organized directed at raising the overall level of the therapeutic-prophylactic care of persons of older age in all components. This is provided primarily by a system of measures to enhance planned hospitalization and improve dispensary observation. In elevating the qualifications of medical workers at all stages of their training, including the local bases, attention must be given to questions of features of the course and treatment of diseases in persons of elderly and advanced age. An important role in the service of persons of older ages living in remote settlements belongs to the physician specialists of mobile brigades and polyclinics. In their turn,

the middle medical workers of feldsher-midwife points must bear responsibility for the selection of patients for physician receiving and the detection of persons not using medical care.

Parallel to the efforts directed at prolonging the life of the people, a complex of measures must be implemented for retaining their active work capacity, and all possibilities must be considered for using the work capacity of persons of pension age.

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BIOLOGICAL SCAPEL

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 25 Jan 83 p 2

[Article by N. Shirobokov, Irkutsk]

[Text] It would seem that medicine is quite far removed from economics. But let us not be hasty. Take a typical instance: a worker has injured a hand. Infection has begun. And, while sympathizing with the worker, we must recognize that neither is it sweet for the enterprise. Of course, one day of work incapacity is expensive.

S. Morosov, surgeon of the Irkutsk Airplane Factory polyclinic, has in three months treated dozens of patients with hand injuries. Moreover, thanks to the application of a new preparation developed by Siberian scientists, people are on sick leave for half the normal time. According to calculations, S. Morosov saved the factory about 20,000 rubles. And this in only three months.

Meanwhile, the assistant in the Surgical Department of the Irkutsk Advanced Training of Physicians Institute L. Kurlikov, who is involved in treating protractedly-nonhealing wounds with which patients undergo prolonged treatment at hospitals, received good results by using a new method and saved still more. And if one considers that the annual losses for the nation from purulent wounds comprise millions of man-days then a reduction by half in the duration of the time of work incapacity permits avoidance of losses of tens and even hundreds of millions of rubles.

The new method is of special importance for Siberia, where many young people are arriving. The people are all energetic and eager but, unfortunately, insufficiently trained. An axe is swung clumsily, a hammer lands on a finger, frostbite--anything can happen in Siberia. Modern and effective care is simply indispensable here. Irkutsk surgeons began applying the new preparation on the Baikal-Siberian Railway. What is this miracle preparation?

It is called "profezim". And it was created by groups of scientists of the Cytology and Genetics Institute of the USSR Academy of Sciences Siberian Department and by specialists of the Main Administration of the Microbiological Industry under the supervision of D. Belyayev, R. Salganik, S. Zagrebel'niy and A. Kogan.

"The miracles are worked in our preparation by enzymes," says chief of the Surgery Department of the Advanced Training of Physicians Institute, Professor A. Kogan. "These are known to be the biological catalysts of the diverse chemical reactions in the organism. But their manufacture was not inexpensive, and activity was manifested for only a few hours. We 'cross-linked' these enzymes with polymeric carriers or, graphically speaking, tied them like a dog on a chain. As a result of such restraint, an absolutely safe, cheaply-manufactured and effective biological scapel was obtained. The activity of the preparation immediately jumped from one hour to 10 days. It became insoluble and lost the capacity to penetrate the blood. It can be called a biological scapel because it removes all that is dead and does not touch living tissue."

At the Exhibition of the Achievements of the USSR National Economy where there was held the exhibition "Scientific-Tedhnical Progress in Novosibirsk Oblast", "profezim" merited a gold prize. The reason--for industrial manufacture and massive application of the preparation in medical practice. But the management of Berdskoye Chemical Factory in Novosibirsk Oblast declined to exploit the preparation. The primary organization of the scientific-technical department of this factory must speak for itself here. Together with the Novosibirsk Oblast Soviet, the scientific-technical department organization must take control of the introduction of the new preparation.

Medicine must be considered a full-fledged industrial force in the economic mechanism--it conceals vast reserves and potentials. Only with such an approach will the best achievements of scientists find a much more rapid route to the people. Among these achievements is the miraculous preparation "profezim", created in Novosibirsk and tested on the Angar.

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NEW ESTONIAN RAYON HOSPITAL

Tallinn SOVETSKAYA ESTONIYA in Russian 16 Dec 82 p 2

[Article by SOVETSKAYA ESTONIYA correspondent N. Shvyrov in the column "All Starters--to the Mark!": "Value Each Hour"]

[Text] The northwestern outskirts of Yygeva are adorned by large bright buildings, faced with Saaremaa dolomite.

"This will be the new central rayon hospital, the largest structure of the current year in the rayon," explains the second secretary of the Yygeva Party Rayon Committee A. Orgulas. "The general contractor, the Yygeva Mobile Mechanized Column, accepted the obligation of surrendering this structure, so important to the city and the entire rayon, by 25 December. And, in my view, the builders will keep their word...."

On these December days work 220 builders, in addition to 25 specialists of various subcontractor organizations and about 50 solicitous sponsors from various rayon organizations and farms. Nearly 2.5 million rubles worth of construction and installation work has been done since August 1979, when the first bulldozers arrived at the vacant lot. All three buildings are now for the most part ready. Finishing and sanitary-engineering work is now underway in them.

What does the future hospital offer? I posed this question to the chief physician P. Ott.

"Of course," he said, "the new 205-bed hospital is for us, the physicians, a great joy. Surgical, therapeutic, pediatric and maternity departments will begin operating here in the new year. Furthermore, two X-ray clinics, fluorography, functional-diagnostics and physical-therapy clinics, a laboratory, etc., will be equipped. The construction near the hospital of a polyclinic, a central pharmacy and a sanitary-epidemiologic station is in the perspective plan. But I am now troubled by the absence of certain equipment for the structure, and another no less important problem is the makeup of the medical and technical personnel."

The course of the construction as a whole also surprized the chief engineer of the Yygeva Mobile Mechanized Column E. Lepik, the supervisor of the new structure. He spoke favorably of the highly-productive work of I. Zhilits's complex brigade, which is now involved in the installation of the elevators. The complex brigade of M. Sootl, whose portrait was hung at the Rayon Board of Honor, just finished laying the inlaid floors.

And what troubles the chief engineer? The slow work of certain subcontractors, primarily the specialists from the Tallinn Administration for Ventilation Work. The volume of installation work that remains to be done in December is still very large, and these days there are only seven ventilation specialists at the construction site, while at least 17 are needed. Two air conditioners are still lacking. There are several other "bottlenecks" at the new structure. For example, no small amount remains to be done in December by the electricians and sanitary engineers. The problem of supplying the new building with the necessary medical equipment has not been completely solved. We recall something else. More than 100,000 rubles of construction and installation work remains to be done before the new year.

The dates press in on the builders. Time, as they say, does not give extensions. It is also clear that the last week of December will be still more intense, and, so as not to collapse at the finish, each hour, each minute of work time must now be valued.

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CSO: 1840/227

BRIEFS

ASHKHABAD MOTHER-CHILD HEALTH CARE INSTITUTE--Perhaps, there is no more noble goal in medicine than the health care of the mother and child. Thousands of physicians and nurses in the republic attentively follow the condition of small patients. The complex of the Mother-Child Health Care Institute was created in Ashkhabad. It was equipped with the most modern medical instruments. Experienced specialists work here, involved not only in treating ill children but also in the prophylaxis of various illnesses. IN THE PHOTOGRAPH: chief of the Immunology and Virology Laboratory of the Mother-Child Health Care Scientific Research Institute A. N. Yasniskaya and junior scientific associate O. Kh. Allnazarova perform high-speed diagnosis of infectious viruses. Photo by V. Nechayev. [Text] [Ashkhabad TURKMENSKAYA ISKRA in Russian 23 Jan 83 p 3] [COPYRIGHT: "Turkmenskaya iskra"] 9942

CSO: 1984/207

BRIEFS

PUBLIC HEALTH CONFERENCE--Today in Voronezh an All-RSFSR conference was opened on questions of the further improvement of the health care of the population. Problems will be discussed concerning medical service, prophylatic work, resort-sanatorium treatment and pharmacy affairs. Speaking to the participants of the conference will be the Deputy Chairman of the RSFSR Council of Ministers L. P. Lykova, the USSR Minister of Health S. P. Burenkov, the RSFSR Deputy Minister of Health N. T. Trubilin and other responsible workers of union and republic ministries and departments. [Article by V. Mar'yan and A. Pyatunin: "The People's Health is a National Treasure", Voronezh] [Text] [Moscow SOVETSKAYA ROSSIYA in Russian 12 Jan 83 p 2] 9942

CSO: 1840/215

BRIEFS

MOLDAVIAN HEALTH SERVICE--The residents of Kishinev have received a new form of medical care--neuro-orthopedics. A clinic of this profile was opened in the third city polyclinic where patients can, without surgical intervention, be cured of a number of severe spinal pains. The workers of the Moldavian capital are now provided with more than 40 forms of medical service. These forms were all introduced according to the program of urban health-care concentration and specialization. Microrayon residents are served by large medical unions with modern multiprofile hospitals and polyclinics. Cardiology, hepatology and gastroenterology and acu-reflexo-therapy centers are active. Disease-prophylaxis and rehabilitative-therapy departments have also been established. More than 20 million rubles are annually spent on the development of these and other health services. [Text] [Kishinev SOVETSKAYA MOLDAVIYA in Russian 10 Nov 82 p 4] 9942

CSO: 1840/227

BRIEFS

CONCERN FOR PEOPLE'S HEALTH--The nation-wide character of the social policies of the CPSU and Soviet Government is vividly displayed in the development of socialist society. These policies are aimed at solving such questions vital to all republics as enhancing the well-being and level of education and sophistication of the workers, improving their working and resting conditions, developing housing construction, improving the system of social security and medical and consumer service and protecting the surrounding environment. The development of health care is vivid evidence of the constant concern of the Communist Party and the Soviet Government for the good of the people and the health of the workers. A unified state health-care system is active and developing in the Soviet Union. The right of Soviet citizens for health care, guaranteed by the USSR Constitution, is provided by free qualified medical assistance. The network of institutions for treating and strengthening the health of the workers is continuously expanded. The number of hospital beds increased by more than 17-fold dufing the past 60 years and in 1981 comprised 3,384,000. A broad program for the further development of the health care system is being implemented in the 11th Five-Year Plan. A high level of medical service has been achieved in the Soviet Union. At the present time more than one million physicians work in the USSR--this is more than one third of all the physicians in the world. [Text] [Moscow EKONOMICHESKAYA GAZETA in Russian No 48, Nov 82 p 1] 9942

CSO: 1840/215

UDC 618.2+616-053.7-001.8-07

PATHOGENETIC SIGNIFICANCE OF HYPOXIC SYNDROME IN GRAVIDAE AND CHILDREN

Kiev FIZIOLOGICHESKIY ZHURNAL in Russian Vol 28, No 5, Sep-Oct 82
(manuscript received 4 May 82) pp 522-529

LUK'YANOVA, Ye. M., Kiev Institute of Pediatrics, Obstetrics and Gynecology

[Abstract] Clinical studies were correlated with biochemical findings to determine the significance of the hypoxic state for gravida and her child. The results showed that oxygen deficiency with various degrees of compensation was present in gravidae with toxemia of pregnancy, hypertension, and with various forms of extragenital pathology (particularly rheumatic heart disease and congenital heart defects) due to hemodynamic changes. The latter affected uterine hemodynamics and blood (and oxygen) delivery to the fetus. Such neonates generally showed evidence of oxygen deficiency even in the face of high Apgar scores; the symptomatology was exacerbated in premature infants. Furthermore, infants with gastroduodenal and hepatobiliary disorders presented with abnormal blood chemistries indicative of compensated metabolic acidosis. These observations indicate that in such conditions therapeutic measures must be undertaken to alleviate the effects of hypoxic complications. Figures 2; references 16: 3 Ukrainian, 13 Russian.
[232-12172]

UDC 618.29+616-053.31-001.8-092-08:615.3

PATHOPHYSIOLOGIC BASIS OF CHEMOTHERAPY OF FETAL AND NEONATAL HYPOXIA

Kiev FIZIOLOGICHESKIY ZHURNAL in Russian Vol 28, No 5, Sep-Oct 82
(manuscript received 4 May 82) pp 530-535

TARAKHOVSKIY, M. L., Kiev Institute of Pediatrics, Obstetrics and Gynecology

[Abstract] Chemotherapeutic trials were conducted on gravid rabbits with experimentally induced cardiovascular insufficiency to identify drugs efficient in improving oxygen delivery across the fetomaternal barrier. Evaluation of the findings in clinical and biochemical terms showed that

treatment of the gravid females with chromonar (Intenkordin), dimercaprol, and unithiol was effective in improving the metabolic status of the mother and neonate and decreased fetal mortality. These observations indicate that perinatal hypoxia can be alleviated by the proper chemotherapy directed at improving oxygen delivery to the fetus and that these experiments may serve as a model for human pregnancies complicated by hypoxia (e. g., toxemia of pregnancy, acquired and congenital maternal heart lesions, etc.). Figures 2; references 31: 28 Russian, 3 Western.
[232-12172]

UDC: 575.591

NONSPECIFIC RESISTANCE AND PREDISPOSITION TO ACUTE LEUKOSIS IN CHILDREN.

Moscow GENETIKA in Russian Vol 18, No 7, Jul 82
(manuscript received 31 Mar 81; in final form 4 Aug 81) pp 1173-1182

KURBATOVA, O. L., BOTVIN'EV, O. K., DESHCHEKINA, M. F., TORBYAK, I. T. and ALTUKHOV, Yu. P., Institute of General Genetics, USSR Academy of Sciences, Moscow; Second Moscow State Medical Institute imeni N. I. Pirogov

[Abstract] A study is made of the significance of general nonspecific resistance of the body in the genesis of acute leukoses in children. Four hundred twenty two case histories of children with acute leukosis (229 males and 193 females) from the archives of several Moscow hospitals covering the period from 1959 through 1979 were studied. Anthropometric indices were analyzed and compared to a control group of 396 healthy children. The results indicate that children of average length and weight at birth were found to be least likely to contract the disease. Children who were unusually heavy or light for their length were most likely to contract the disease. The data indicate disruption of normal prenatal ontogenesis in individuals who will later contract leukosis, which is supported by the higher frequency of infectious and inflammatory disease in the history of children who later contracted leukosis. Figures 4; references 17: 15 Russian, 2 Western.
[198-6508]

UDC: 591.575

STUDY OF MOLECULAR CAUSES OF THALASSEMIA. III. MOLECULAR-GENETIC VERSIONS OF β-THALASSEMIA IN AZERBAIJAN

Moscow GENETIKA in Russian Vol 18, No 7, Jul 82
(manuscript received 17 Dec 81) pp 1045-1055

DERGUNOVA, L. V., SLOMINSKIY, P. A., RUSTAMOV, R. Sh., DADASHEVA, T. S., AMZASHVILI, M. G., and LIMBORSKAYA, S. A., Institute of Molecular Biology, USSR Academy of Sciences; Institute of Medical Genetics, USSR Academy of Medical Sciences, Moscow; Azerbaijan Scientific Research Institute of Hematology and Blood Transfusion, Azerbaijan Ministry of Health; Azerbaijan Scientific Research Institute of Protection of Mothers and Children imeni N. K. Krupskaya, Azerbaijan Ministry of Health, Baku

[Abstract] Molecular-genetic studies were performed on patients from Azerbaijan, where the frequency of heterozygote thalassemia genes is particularly high. Analysis of newly synthesized globin protein chains revealed cases of β^+ and β^0 thalassemia. In many patients a hybridization method was used to determine the relative content of RNA globin sequences in blood reticulocytes. In one case of β^+ thalassemia the nuclear and cytoplasmic fractions of RNA from the spleen were studied. Restriction mapping of globin genes was undertaken in two cases of the disease. Figures 6; references 30: 7 Russian, 23 Western.
[198-6508]

UDC 614.86(477):313.13

TRAFFIC INJURIES AND THEIR PREVENTION

Moscow ORTOPEDIYA, TRAVMATOLOGIYA I PROTEZIROVANIYE in Russian No 9, Sep 82 (manuscript received 23 Feb 82) pp 46-50

GRABOVOY, A. F., SARANCHA, S. D., MEZHENSKIY, P. S. and IVCHENKO, V. K., Chair of Traumatology, Orthopedics and Military Field Surgery, Voroshilovgrad Medical Institute

[Abstract] The incidence and causes of motor vehicle injuries in the Voroshilovgrad Oblast of the Ukrainian SSR are reviewed for the period 1976-1980. In that time the annual increase in traffic-related injuries increased by 6.5%, with a mortality figure of 17.4%. The vast majority of the accidents were caused by car and motorcycle drivers who exceeded the speed limit (79.6%) and of whom 30.5% were inebriated. Almost 80% of the individuals injured in the city reached a hospital by ambulance, whereas 70% of the cases in outlying regions had to rely on other forms of transportation to reach a hospital or some other medical facility. Primary factors in the reversal of this trend would appear to be better urban

planning to handle the growing increase in traffic, educational measures aimed at the public and drivers, and improvement in the training of first-aid personnel and emergency r-om staff in the management of injured and traumatized individuals. References 7 (Russian).
[219-12172]

UDC 614.86:312.2

TRAFFIC ACCIDENT MORTALITY DATA

Moscow ORTOPEDIA, TRAVMATOLOGIYA I PROTEZIROVANIYE in Russian No 9, Sep 82 (manuscript received 23 Feb 82) pp 50-52

TKESHELASHVILI, M. B., LORDKIPANIDZE, Ye. F., KAKAURIDZE, M. V. and LEKISHVILI, M. N., Scientific Center of Traumatology and Orthopedics, Georgian SSR Ministry of Health

[Abstract] An analysis was undertaken of traffic mortality figures in Tbilisi for the years 1975-1980. The results showed that the number of fatalities due to pedestrians being hit by a car fell from 75% of the total number in 1975 to 34.5% in 1980, but that the percentage of incidents in which drunk drivers were involved rose from 15% in 1975 to 25.5% by 1980. Most of the fatalities were due to injuries involving the brain, internal organs, and hemorrhage. Because of improved ambulance service prehos ital mortality fell from 52.7% in 1975 to 38.5% in 1980, while the death rate for those reaching a hospital fell to 9.7% within the first two hours from 52.7% in 1975. Comparison of autopsy findings with clinical diagnosis showed that in 1980 35.8% of the cases were misdiagnosed as to injury, particularly in the case of lung and liver trauma. While considerable progress has been made in collecting and analyzing such data for purposes of further improving services and decreasing the mortality figures, utilization of computer-based data processing should further advance efforts at minimizing traffic mortality.
[219-12172]

ORGANIZATION OF PREVENTIVE MEASURES FOR TOXICO-SEPTIC DISEASES IN NEWBORN

Frunze ZDRAVOOKHRANENIYE KIRGIZII in Russian No 6, Nov-Dec 82 pp 31-35

RYBALKINA, L. D., Kirghiz Scientific Research Institute of Obstetrics and Pediatrics

[Abstract] The problem of toxico-septic infection of the newborn is on the rise in the USSR and other countries, due in large measure to the increase

in drug-resistant strains encountered in the hospital setting. Measures taken to control and reverse this trend include identification and treatment of carriers among medical personnel and the prevention of spread of the pathogenic strains by initiation of vigorous aseptic procedures and disinfection whenever appropriate, and by greater supportive care of the mother and the infant designed to enhance their natural and acquired immunity.
[221-12172]

UDC: 575.24:575.91

STUDY OF FREQUENCY OF CHROMOSOMAL DISORDERS IN HUMAN LYMPHOCYTES UPON EXPOSURE TO VARIOUS DOSES OF DUETERONS IN VITRO WITH ADETURONE PROTECTION

Moscow GENETIKA in Russian Vol 18, No 7, Jul 82
(manuscript received 1 Dec 80; in final form 23 Jun 81) pp 1164-1168

BULANOVA, M. D., IVANOV, B. A., MILEVA, M. S., RYZHOV, N. I. and GERASIMENKO, V. N., Institute of Radiology and Radiobiology, Medical Academy, Sofia; Institute of Medical-Biological Problems, USSR Ministry of Health, Moscow

[Abstract] A study was performed of the frequency of chromosomal disorders in human peripheral blood lymphocytes upon exposure to 4.2 GeV deuterons under normal conditions and following prophylactic administration of adeturone. Whole peripheral blood from 4 clinically healthy donors was irradiated in vitro by 4.2 GeV deuterons at $4\text{-}6\cdot10^{10}$ particles per pulse at the Joint Institute of Nuclear Research in Dubna. Specimens were irradiated at room temperature, total dose 0.26 to 3.81 Gr. In the protected versions, 15 to 20 minutes before irradiation adeturone (β-aminoethylisothiuronium adenosine triphosphate) was added at 550 mg/ml of blood. This concentration of adeturone is not mutagenic. The irradiated blood cells were cultivated for 53 hours and quantitative changes in structural chromosomal disorders counted under a microscope, magnification 100X10. The results were processed by variational and regression analysis using the t criterion. The results confirmed the possibility of adeturone protection against large doses of radiation at relativistic energies. It is possible that the substance hinders the movement of greatly damaged lymphocytes through the cell cycle. With cultivation times longer than 53 hours, higher frequencies of chromosomal aberrations may be observed with adeturone present. Further studies are required to determine this. Figures 1; references 6: 4 Russian, 1 Bulgarian, 1 Western.
[198-6508]

UDC 616-001.28-07:616:831-008.93:577.175.859

BRAIN PROSTAGLANDIN SYNTHETASE ACTIVITY IN ANIMALS WITH RADIATION SICKNESS

Moscow VESTNIK AKADEMII MEDITSINSKIKH NAUK SSSR in Russian No 9, Sep 82 (manuscript received 7 Dec 81) pp 86-89

ROMANTSEV, Ye. F., ZHULANOVA, Z. I. and NIKANDROVA, T. I., Institute of Biophysics, USSR Ministry of Health, Moscow

[Abstract] Studies were conducted on the changes in brain activity of prostaglandin (PG) synthetase of (CBA X C57BL)F_1 mice with various forms of radiation sickness induced by irradiation with Co-60. In animals with bone marrow type of radiation sickness (exposed to 9.5 Gy) a biphasic increase in the activities of PGE_2 and PGF_{2a} synthetase were seen: the first occurring 15 min after exposure and the second 72 h after exposure. In animals with the neural form of radiation sickness (250 Gy, linear electron accelerator source) peak PG synthetase activity was seen 60 min a ter exposure, and in the intestinal form (13 Gy) maximum activity was observed after 6 h. These observations point to the importance of the PGs in maintaining cellular homeostasis since the metabolic resources of the brain tissue are directed at the synthesis of these compounds, presumably via activation of the hypothalamus-hypophysis-adrenal cortex endocrine axis. Figures 3; references 12: 8 Russian, 4 Western.
[255-12172]

UDC 591.181

DETERMINATION OF VISUAL PERCEPTION TIME: METHODS AND RESULTS

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 268, No 3, Jan 83
(manuscript received 25 Jun 82) pp 750-753

IVANITSKIY, A. M. and KORSAKOV, I. A., All-Union Scientific Research Institute of General and Forensic Psychiatry imeni V. P. Serbskiy, Moscow

[Abstract] Investigations were conducted on 24 healthy subjects to determine visual perception times in tests involving exposure to paired flashes of light of equal or different intensities (0.18 and 0.18 J or 0.18 and 0.27 J pairs), with concomitant recordings of change in sign of slow electrical activity in the visual cortex. The results showed that if a change in sign of the first derivative of the slow electrical activity is within 75-175 msec of the presentation of the first flash, erroneous evaluation of intensity is made in 92.6% of the cases; the corresponding figures for the second flash are a time interval of 75-225 msec and 90.8% error. The 175 msec time interval was interpreted to indicate the time required for perception of intensity, while the 225 msec interval encompassed both perception and decision making as to the relative intensity of both flashes. Figures 2; references 9: 5 Russian, 4 Western.
[218-12172]

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